



# City & Guilds Level 2 Technical Certificate in Horticulture (0174-20)

August 2019 Version 2.3

**Qualification Handbook**

## Qualification at a glance

<b>Industry area</b>	Horticulture and Forestry
<b>City &amp; Guilds qualification number</b>	0174-20
<b>Age group</b>	16-19 (Key Stage 5), 19+
<b>Entry requirements</b>	Centres must ensure that any pre-requisites stated in the <i>What is this qualification about?</i> section are met.
<b>Assessment</b>	<p>To gain this qualification, candidates must successfully achieve the following assessments:</p> <ul style="list-style-type: none"> <li>• One externally set, internally marked health and safety assignment</li> <li>• One externally set, externally marked exam, sat under examination conditions</li> <li>• One externally set, internally marked, externally moderated assignment.</li> </ul>
<b>Additional requirements to gain this qualification</b>	Employer involvement in the delivery and/or assessment of this qualification is essential for all candidates and will be externally quality assured.
<b>Grading</b>	<p>This qualification is graded Pass/Merit/Distinction/Distinction*</p> <p>For more information on grading, please see Section 7: Grading.</p>
<b>Approvals</b>	These qualifications require full centre and qualification approval.
<b>Support materials</b>	<p>Sample assessments</p> <p>Guidance for delivery</p> <p>Guidance on use of marking grids</p>
<b>Registration and certification</b>	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.
<b>External quality assurance</b>	This qualification is externally quality assured by City & Guilds, and its internally marked assignments are subject to external moderation. There is no direct claim status available for this qualification.

Title and level	Size (GLH)	TQT	City & Guilds qualification number	Ofqual accreditation number
City & Guilds Level 2 Technical Certificate in Horticulture	360	600	0174-20	603/0868/0

Version and date	Change detail	Section
1.1 June 2017	Assessment overview updated to include an externally set, internally marked and externally moderated assignment	Qualification at a glance
	Amended the title for component 201 to Health and safety for land-based industries - Theory exam (1)	Assessment requirements and employer involvement
	Amended the component number for Employer involvement	Assessment requirements and employer involvement
	Assessment conditions for assessment 201 Changed to externally set, internally marked assignment	Summary of assessment methods and conditions
	Assessment objectives table Removed the Assessment Objectives 6 – 8 and changed the weighting/amended descriptors for the assessment objectives 1 -5	Assessment objectives
	Amended the duration for the external exam to 1.5 hours	Exam specification
	Amended the number of units and marks per unit/overall for the external exam	Exam specification
1.2 June 2017	Added optional assessment components to the list of assessment requirements	Assessment requirements and employer involvement
1.3 August 2017	Qualification at glance section – assessment	Qualification at a glance
	Branding	Throughout
1.4 September 2017	Purpose statement amended to include how the qualification relates to a wider learning programme	Purpose statement

	Amended the component number for Health and safety for land-based industries – Theory exam	Assessment requirements and employer involvement
	Amended the number of units and marks per unit/overall for the external exam	Exam specification
1.5 September 2017	Unit 201 title amended	Throughout
1.6 October 2017	Assessment type for unit 201 changed to assignment	1. Introduction 5. Assessment
1.7 November 2017	Amended the number of units and marks per unit in the test specification for the external exam	Exam specification
1.8 December 2017	Amendment to summary of assessment methods and conditions table	5. Assessment
1.9 February 2018	Titles of components 020 and 021/521 amended	Assessment requirements and employer involvement
1.10 August 2018	City & Guilds added to the title	Throughout
2.0 September 2018	Amendment to summary of assessment methods and conditions table – Assessment 201	Assessment
2.1 October 2018	Added assessment method for unit 201	1. Introduction – Assessment requirements and employer involvement
	Amended assessment method for unit 201	5. Assessment - Summary of assessment methods and conditions
2.2 June 2019	Amendments made to spelling of botanical names	Unit 204
2.3 August 2019	Unit 202 aim and delivery guidance updated for work experience requirements	Unit 202

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# 1 Introduction

## What is this qualification about?

### Purpose statement

The following purpose is for the **Technical Certificate in Horticulture (603/0868/0)**.

Area	Description
OVERVIEW	
Who is this qualification for?	<p>This City &amp; Guilds Level 2 Technical Certificate in Horticulture is for you if you are looking to start a career within the horticultural sector.</p> <p>The horticulture sector is made up of many diverse industries delivering the science, art, technology and business of 'growing plants'. The careers within horticulture are varied and range from crop production (fruit, vegetables, flowers, trees &amp; shrubs and glasshouse crops), to landscaping, garden design and sports turf. Horticulture has a massive part to play in the future for our planet and the living things on it. From the food we eat, the sports we play, caring for the conservation of our environment, and the creation of beautiful spaces for our own human and health &amp; wellbeing.</p> <p>The potential is vast and if you're ambitious, there is real scope to progress in this industry, have a fantastic, worthwhile, enjoyable career and make a real difference to the future of our planet and the people and creatures who live on it.</p> <p>This qualification is suitable if you are 16 years old, or over. You may or may not have any previous knowledge or experience in horticulture.</p> <p>You will gain an understanding of the skills and knowledge that are important when you are working in a horticultural setting, or progressing to further learning and training in this area.</p>
What does this qualification cover?	<p>This qualification covers the skills you will need to progress to further learning and training, or to enter the world of work within the horticultural sector. You will study the following mandatory content:</p> <ul style="list-style-type: none"><li>• Health and safety for the land-based industries</li><li>• Working in the horticulture industry</li></ul>



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- Plant naming, identification, selection and science
  - Establishment and maintenance of plants outdoors
  - Care, maintenance and use of tools and machinery
  - Horticulture business skills

There is also a requirement to complete 150 hours of work experience.

You will then have the choice of studying one of the following areas:

- Commercial gardening and landscaping
- Sports turf technology
- Developing hard landscapes
- Production techniques in horticulture

The optional units can be chosen to reflect local or regional industry or business needs. They may help with your progression onto the Level 3 Technical qualifications where there maybe options, or pathways for you to choose from.

You will get lots of practice and support to enable you to develop the required skills and knowledge to prepare you for the learning and end assessment.

Colleges and training/education centres will work with local employers who will contribute to the knowledge and delivery of training. The different ways in which centres could support your learning, by working with both local and national horticultural businesses, include:

- structured work-experience or work-placements within their business
- your attendance at classes or lectures given by industry experts
- employers input into projects and exercises
- employers who act as 'expert witnesses' to contribute to the assessment of your work.

This practical based training is ideal preparation for gaining employment in the horticultural sector or specialist further study.

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How does this qualification relate to a wider learning programme

This qualification provides an opportunity for you to gain real work specific skills and knowledge, and enables you to link your technical learning to the work experience part of your course. There may also be the opportunity to undertake short courses or qualifications, such as our Certificates of Technical Competence or a GCSE in Biology, alongside this qualification.

When taken as part of a full study programme you will typically receive regular personal tutorials which will help with target setting, enabling you to reflect on and improve your

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performance and progress. You will also benefit from enrichment activities to develop your employability, team work and problem solving skills. These are essential when working in industry.

Typically, you will also take this qualification alongside English and/or maths, so these, as well as digital technology are included within the course to enhance your skills which will assist you with future job opportunities or progression to higher level learning.

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#### WHAT COULD THIS QUALIFICATION LEAD TO?

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Will the qualification lead to employment, and if so, in which job role and at what level?

Achievement of this qualification demonstrates to an employer that you have the necessary technical skills and knowledge they are looking for when recruiting for a trainee:

- horticulture operative
- landscape operative
- golf greenkeeper

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Why choose this qualification over similar qualifications?

There are no other College-based qualifications within this suite at this Level.

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Will the qualification lead to further learning?

Yes. Once you have successfully completed this qualification, you could go on to study a Level 3 College-based qualification over one year, or two years.

Over one year:

- Level 3 Advanced Technical Certificate in Horticulture
- Level 3 Advanced Technical Diploma in Horticulture (540)

Over two years:

- Level 3 Advanced Technical Extended Diploma in Horticulture (720)
- Level 3 Advanced Technical Extended Diploma in Horticulture (1080) (Professional Horticulture) or (Sports Turf)

The larger qualifications taken over two years will allow you to specialise in professional horticulture or sports turf, which could lead to a greater range of more diverse career opportunities.

This qualification could also lead you to an apprenticeship in Horticulture. There are a number of new and exciting apprenticeships currently being developed in the following occupations. Depending upon what you have achieved previously, you could progress to an apprenticeship as a:

- horticulture operative
  - landscape operative
  - horticulture supervisor
  - landscape supervisor
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#### WHO SUPPORTS THIS QUALIFICATION?

Professional/Trade Associations	Chartered Institute of Horticulture (CIH) The Greenkeepers Training Committee (GTC)
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FURTHER INFORMATION	Please refer to the Qualification Handbook, available on the City & Guilds website, for more information on the structure of this qualification, the content of the units, and assessment.
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## Qualification structure

For the **City & Guilds Level 2 Technical Certificate in Horticulture** the teaching programme must cover the content detailed in the structure below:

Level 2 Technical Certificate in Horticulture		
City & Guilds unit number	Unit title	GLH
<b>Mandatory</b>		
201	Health and safety for the land-based industries	30
202	Working in the horticulture industry	30
203	Plant naming, identification, selection and science	30
204	Preparation, planting and maintenance of plants	60
205	Care, maintenance and use of tools, equipment and machinery	30
206	Horticultural business practices	30
<b>Optional</b>		
207	Commercial gardening and landscaping	150
208	Sports turf technology	150
209	Developing hard landscapes	150
210	Production techniques in horticulture	150

## Total qualification time (TQT)

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
City & Guilds Level 2 Technical Certificate in Horticulture	360	600

## Assessment requirements and employer involvement

To achieve the **City & Guilds Level 2 Technical Certificate in Horticulture** candidates must successfully complete **all** the mandatory assessment components **as well as** an optional assessment component for their **one** chosen optional unit.

Component number	Title
<b>Mandatory</b>	
020	Level 2 Horticulture - Synoptic Assignment
021 or 521	Level 2 Horticulture – Theory exam
201	Health and safety for the land-based industries – Theory exam
<b>Optional</b>	
207	Level 2 Commercial gardening and landscaping - Assignment
208	Level 2 Sports turf technology - Assignment
209	Level 2 Developing hard landscapes - Assignment
210	Level 2 Production techniques in horticulture - Assignment

In addition, candidates **must** achieve the mandatory employer involvement requirement for this qualification **before** they can be awarded a qualification grade. For more information, please see guidance in *Section 4: Employer involvement*.

### Employer involvement

Component number	Title
<b>Mandatory</b>	
820	Employer involvement

*\*Number of mandatory assessments per assessment type*

## 2 Centre requirements

### Approval

New centres will need to gain centre approval. Existing centres who wish to offer this qualification must go through City & Guilds' **full** Qualification Approval Process. There is no fast track approval for this qualification. Please refer to the City & Guilds website for further information on the approval process: [www.cityandguilds.com](http://www.cityandguilds.com)

### Resource requirements

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

### Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following requirements:

- be technically competent in the areas in which they are delivering
- be able to deliver across the breadth and depth of the content of the qualification being taught
- have recent relevant teaching and assessment experience in the specific area they will be teaching, or be working towards this
- demonstrate continuing CPD.

### Physical resources

Centres must be able to demonstrate that they have access to the equipment and technical resources required to deliver this qualification and its assessment.

### Internal Quality Assurance

Internal quality assurance is key to ensuring accuracy and consistency of tutors and markers. Internal Quality Assurers (IQAs) monitor the work of all tutors involved with a qualification to ensure they are applying standards consistently throughout assessment activities. IQAs must have, and maintain, an appropriate level of technical competence and be qualified to make both marking and quality assurance decisions through a teaching qualification or recent, relevant experience.

### Learner entry requirements

Centres must ensure that all learners have the opportunity to gain the qualification through appropriate study and training, and that any prerequisites stated in the *What is this qualification about?* section are met when registering on this qualification.

### Age restrictions

This qualification is approved for learners aged 16 – 19, 19+.

## 3 Delivering technical qualifications

### Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific learning or training needs,
- any support and guidance they may need when working towards their qualification,
- the appropriate type and level of qualification.

We recommend that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

### Employer involvement

Employer involvement is essential to maximise the value of each learner's experience. Centres are required to involve employers in the delivery of technical qualifications at Key Stage 5 and/or their assessment, for every learner. This must be in place or planned before delivery programmes begin in order to gain qualification approval. See *Section 4: Employer involvement* for more detail.

### Work experience

Work experience will provide learners with the opportunity to participate in the world of work and gain practical experience that is relevant to both the qualification and future employment possibilities.

Each learner is expected to complete a 150 hours work experience placement as part of the programme. This work placement should be with an employer that will provide the learner with structured opportunities to develop the skills and knowledge that are relevant to the qualification and should be undertaken in a real business environment relevant to the subject interest of the learner. Work experience may be gained by a number of routes, e.g. as part of an industrial placement whilst within the programme, whilst working on a planned daily or weekly basis on the centre's commercial and/or educational facilities, whilst undertaking voluntary work within the industry, or as a member of a group of learners invited to carry out practical work on a suitable business. The work placement can take place at any time during the learning programme. Centres should be able to provide evidence that the work experience placement has been completed by the learner and this evidence may be reviewed on request by City & Guilds.

The 150 hours work experience is included in the Total Qualification Time

## Support materials

The following resources are available for this qualification:

Description	How to access
Sample assessments	Available 2017 on the qualification pages on the <b>City &amp; Guilds Website: <a href="http://www.cityandguilds.com">www.cityandguilds.com</a></b>
Technical Qualifications: Guide to Teaching, Learning and Assessment	Available on the City and Guild website: <b><a href="https://www.cityandguilds.com/techbac/technical-qualifications/resources-and-support#teaching">https://www.cityandguilds.com/techbac/technical-qualifications/resources-and-support#teaching</a></b>
Technical Qualifications: Marking and Moderation Guide	Available on the City and Guild website: <b><a href="https://www.cityandguilds.com/techbac/technical-qualifications/resources-and-support#teaching">https://www.cityandguilds.com/techbac/technical-qualifications/resources-and-support#teaching</a></b>



## 4 Employer involvement

Employer involvement is a formal component of Key Stage 5 Technical qualifications. It does not contribute to the overall qualification grading, but is a mandatory requirement that all learners must meet. As such it is subject to external quality assurance by City & Guilds.

Department for Education (DfE) requirements state:

Employer involvement in the delivery and/or assessment of technical qualifications provides a clear 'line of sight' to work, enriches learning, raises the credibility of the qualification in the eyes of employers, parents and students and furthers collaboration between the learning and skills sector and industry.

[Technical qualifications] must:

- require all students to undertake meaningful activity involving employers during their study; and
- be governed by quality assurance procedures run by the awarding organisation to confirm that education providers have secured employer involvement for every student.

Extract from: **Vocational qualifications for 16 to 19 year olds, 2017 and 2018 performance tables: technical guidance for awarding organisations, paragraphs 89-90**

City & Guilds will provide support, guidance and quality assurance of employer involvement.

### Qualification approval

To be approved to offer City & Guilds technicals, centres must provide an Employer Involvement planner and tracker showing how every learner will be able to experience meaningful employer involvement, and from where sufficient and suitable employer representatives are expected to be sourced.

Centres must include in their planer a sufficient range of activities throughout the learning programme that provide a range of employer interactions for learners. Centres must also plan contingencies for learners who may be absent for employer involvement activities, so that they are not disadvantaged.

As part of the approval process, City & Guilds will review this planner and tracker. Centres which cannot show sufficient commitment from employers and/or a credible planner and tracker will be given an action for improvement with a realistic timescale for completion. **Approval will not be given** if employer involvement cannot be assured either at the start of the qualification, or through an appropriate plan of action to address this requirement before the learner is certificated.

### Monitoring and reporting learner engagement

Employer involvement is a formal component of this qualification and is subject to quality assurance monitoring. Centres must record evidence that demonstrates that each learner has been involved in meaningful employer based activities against the mandatory content before claiming the employer involvement component for learners.

Centres must record the range and type of employer involvement each learner has experienced and submit confirmation that all learners have met the requirements to City & Guilds. If a centre cannot provide evidence that learners have met the requirements to achieve the component, then the learner will not be able to achieve the overall Technical Qualification.

## Types of involvement

Centres should note that to be eligible, employer involvement activities **must** relate to one or more elements of the mandatory content of this qualification.

As the aim of employer involvement is to enrich learning and to give learners a taste of the expectations of employers in the industry area they are studying, centres are encouraged to work creatively with local employers.

Employers can identify the areas of skills and knowledge in their particular industry that they would wish to see emphasised for learners who may apply to work with them in the future. Centres and employers can then establish the type of input, and which employer representative might be able to best support these aims.

To be of most benefit this must add to, rather than replace the centre's programme of learning.

Some examples of meaningful employer involvement are listed below. Employer involvement not related to the mandatory element of the qualification, although valuable in other ways, does not count towards this element of the qualification.

The DfE has provided the following examples of what does and does not count as meaningful employer involvement, as follows<sup>1,2</sup>:

### The following activities meet the requirement for meaningful employer involvement:

- students undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification<sup>3</sup>;
- students undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s);
- students take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures;
- industry practitioners operate as 'expert witnesses' that contribute to the assessment of a student's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.

In all cases participating industry practitioners and employers must be relevant to the industry sector or occupation/occupational group to which the qualification relates.

### The following activities, whilst valuable, do not meet the requirement for meaningful employer involvement:

- employers' or industry practitioners' input to the initial design and content of a qualification;
- employers hosting visits, providing premises, facilities or equipment;
- employers or industry practitioners providing talks or contributing to delivery on employability, general careers advice, CV writing, interview training etc;
- student attendance at career fairs, events or other networking opportunities;
- simulated or provider-based working environments eg hairdressing salons, florists, restaurants, travel agents, small manufacturing units, car servicing facilities;
- employers providing students with job references.

## Types of evidence

For each employer involvement activity, centres are required to provide evidence of which learners undertook it, e.g. a candidate attendance register. The types of additional evidence required to support a claim for this component will vary depending on the nature of the involvement. E.g. for a guest lecture it is expected that a synopsis of the lecture and register would be taken which each

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<sup>1</sup> As extracted from: Vocational qualifications for 16 to 19 year olds  
2017 and 2018 performance tables: technical guidance for awarding organisations

<sup>2</sup> This list has been informed by a call for examples of good practice in employer involvement in the delivery and assessment of technical qualifications - **Employer involvement in the delivery and assessment of vocational qualifications**

<sup>3</sup> **DfE work experience guidance**

learner and the guest speaker will have signed; expert witnesses will be identified and will have signed the relevant assessment paperwork for each learner they have been involved in assessing; evidence of contribution from employers to the development of locally set or adapted assignments.

### **Quality assurance process**

As the employer involvement component is a requirement for achieving the KS5 Technical qualifications, it is subject to external quality assurance by City & Guilds at the approval stage and when centres wish to claim certification for learners.

Evidence will be validated by City & Guilds before learners can achieve the employer involvement component. Where employer involvement is not judged to be sufficient, certificates cannot be claimed for learners.

### **Sufficiency of involvement for each learner**

It is expected that the centre will plan a range of activities that provide sufficient opportunities for each learner to interact directly with a range of individuals employed in the related industry. Centres must also provide contingencies for learners who may be absent for part of their teaching, so they are not disadvantaged. Any absence that results in a learner missing arranged activities must be documented. Where learners are unable to undertake all employer involvement activities due to temporary illness, temporary injury or other indisposition, centres should contact City & Guilds for further guidance.

### **Live involvement**

Learners will gain most benefit from direct interaction with employers and/or their staff; however the use of technology (e.g. the use of live webinars) is encouraged to maximise the range of interactions. Where learners are able to interact in real time with employers, including through the use of technology, this will be classed as 'live involvement'.

It is considered good practice to record learning activities, where possible, to allow learners to revisit their experience and to provide a contingency for absent learners. This is not classed as live involvement however, and any involvement of this type for a learner must be identified as contingency.

### **Timing**

A learner who has not met the minimum requirements cannot be awarded the component, and will therefore not achieve the qualification. It is therefore important that centres give consideration to scheduling employer involvement activities, and that enough time is allotted throughout delivery and assessment of the qualification to ensure that requirements are fully met.

## 5 Assessment

### Summary of assessment methods and conditions

Component numbers	Assessment method	Description and conditions
020	Synoptic assignment	<p>The synoptic assignment is <b>externally set, internally marked and externally moderated</b>. The assignment requires candidates to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from across the content area. Candidates will be judged against the assessment objectives.</p> <p>Assignments will be released to centres as per dates indicated in the Assessment and Examination timetable published on our website.</p> <p>Where seasonality is a factor in the timing of the assignment the assignment will be released early to ensure that candidates can take the assignment to fit in with the seasonal requirements.</p> <p>Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method.</p> <p>There will be <b>one</b> opportunity within each academic year to sit the assignment. Candidates who fail the assignment will have <b>one re-sit</b> opportunity. The re-sit opportunity will be in the next academic year, and will be the assignment set for that academic year once released to centres. If the re-sit is failed, the candidate will fail the qualification.</p> <p>Please note that for externally set assignments City &amp; Guilds provides guidance and support to centres on the marking and moderation process.</p>
021 or 521	Externally marked theory exam	<p>The exam is <b>externally set and externally marked</b> and can be taken either online through City &amp; Guilds' computer-based testing platform, (020) or as a paper based test (521).</p> <p>The exam is designed to assess the candidate's depth and breadth of understanding across content in the qualification at the end of the period of learning, using a range of question types and will be sat under invigilated examination conditions. See JCQ requirements for details: <b><a href="http://www.jcq.org.uk/exams-office/ice--instructions-for-conducting-examinations">http://www.jcq.org.uk/exams-office/ice--instructions-for-conducting-examinations</a></b></p> <p>The exam specification shows the coverage of the exam across the qualification content.</p> <p>Candidates who fail the exam at the first sitting will have <b>one</b> opportunity to re-sit. If the re-sit is failed the candidate will fail the qualification. For exam dates, please refer to the Assessment and Examination timetable published on our website.</p>

201	Internally marked theory exam	<p>This theory exam is <b>externally set, internally marked and externally moderated</b>. It is designed to assess the candidate's depth and breadth of understanding from across the unit content area and will be sat under supervised conditions.</p> <p>This assessment is available on our website. The assessment can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website.</p> <p>Centres will be required to maintain the security of all live assessment materials. Assessments will be password protected and released to centres through a secure method.</p> <p>There is no re-sit limit for this assessment. If a learner fails, they can re-sit a different version. Assessors should allow seven days before reassessment.</p>
Optional units 207 208 209 210	Unit assignment	<p>The unit assignment is <b>externally set, internally marked and externally moderated</b>. The assignment requires candidates to identify and use effectively skills, knowledge and understanding from across the unit content area. Candidates will be judged against the unit grading criteria.</p> <p>The assignments are available on our website. The assignments can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website.</p> <p>Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method.</p> <p>There is no re-sit limit for these assignments. If a learner fails an assignment they can re-sit a different version. Assessors should allow seven days before resubmission or reassessment.</p>

## **What is synoptic assessment?**

Technical qualifications are based around the development of a toolkit of knowledge, understanding and skills that an individual needs in order to have the capability to work in a particular industry or occupational area. Individuals in all technical areas are expected to be able to apply their knowledge, understanding and skills in decision making to solve problems and achieve given outcomes independently and confidently.

City & Guilds technical qualifications require candidates to draw together their learning from across the qualification to solve problems or achieve specific outcomes by explicitly assessing this through the synoptic assignment component.

In this externally set, internally marked and externally moderated assessment the focus is on bringing together, selecting and applying learning from across the qualification rather than demonstrating achievement against units or subsets of the qualification content. The candidate will be given an appropriately levelled, substantial, occupationally relevant problem to solve or outcome to achieve. For example this might be in the form of a briefing from a client, leaving the candidate with the scope to select and carry out the processes required to achieve the client's wishes, as they would in the workplace.

Candidates will be marked against assessment objectives (AOs) such as their breadth and accuracy of knowledge, understanding of concepts, and the quality of their technical skills as well as their ability to use what they have learned in an integrated way to achieve a considered and high quality outcome.

## **How the assignment is synoptic for this qualification**

The typical assignment brief could be to respond to a design problem for a new engineered product or adapting an existing product.

This will require the candidate to carry out experiments on a prototype to evaluate the suitability of different materials. Learners will produce a design specification, with drawings, for a design that meets the brief and produce a production plan for its manufacture. They will need to produce a report on developing the design into a commercial product.

## **External exam for stretch, challenge and integration**

The external assessment will draw from across the mandatory content of the qualification, using a range of shorter questions to confirm breadth of knowledge and understanding. Extended response questions are included to go into more depth, giving candidates the opportunity to demonstrate higher level understanding and integration through discussion, analysis and evaluation, and ensuring the assessment can differentiate between 'just able' and higher achieving candidates.

## Assessment objectives

The assessments for this qualification are set against a number of assessment objectives (AOs) which are used across all City & Guilds Technicals to promote consistency among qualifications of a similar purpose. They are designed to allow judgement of the candidate to be made across a number of different categories of performance.

Each assessment for the qualification has been allocated a set number of marks against these AOs based on weightings recommended by stakeholders of the qualification. This mark allocation remains the same for all versions of the assessments, ensuring consistency across assessment versions and over time.

The following table explains all AOs in detail, including weightings for the synoptic assignments. In some cases, due to the nature of a qualification's content, it is not appropriate to award marks for some AOs. Where this is the case these have been marked as N/A. Weightings for exams (AOs 1, 2 and 4 only) can be found with the exam specification.

Assessment objective	City & Guilds Level 2 Technical Certificate in Horticulture Typical expected evidence of knowledge, understanding and skills	Approximate weighting (Assignment)
<b>A01</b> Recalls knowledge from across the breadth of the qualification.	Reference to legislation, health and safety considerations, industry contacts, associations and events, work tasks for establishing and maintaining plants, naming and identifying plants, soil testing and class, pests, weeds and diseases of lawns, legal and environmental requirements for machinery, requirements of quotes and invoices for customers, methods of communication with customers, customer care skills.	30%
<b>A02</b> Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Plant selection, characteristics of plants, functional characteristics of plants, characteristics of soil, site assessments, control of pests, weeds and diseases of turf, manufacturer's instructions for maintaining equipment, pricing and profit margins, legislation requirements in a horticulture retail environment.	20%
<b>A03</b> Demonstrates technical skills from across the breadth of the qualification.	Site assessments, soil testing, preparing soil/ground for plants by hand or machine, planting and potting plants to nursery guidelines, providing immediate aftercare to plants, establishing grassed areas by seed and turf, maintaining lawns, pre-start checks of tools, equipment and machinery, adjusting machinery for specific tasks, using tools, equipment and machinery safely to achieve desired results to commercial efficiencies, maintaining tools, equipment and machinery, communication methods with customers and peers.	30%
<b>A04</b> Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Linking site assessment and use/purpose of area to plant selection, soil improvement and maintenance activities required eg pest control, irrigation and application of fertilisers.	10%

<p><b>A05</b> Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.</p>	<p>Using feedback on tasks to evaluate self, and improving performance, practising skills to complete tasks to a high standard, preparation for tasks including contingency, checking and re-checking of machinery, accuracy/precision and efficiency in tasks (e.g. mowing straight lines, accurate calibration of machinery), positive work ethic and consideration of industry standard speeds/accuracy for task completion, using accurate presentation, assignment and report writing skills, layout and presentation aid effective communication of information, coherence of recommendations, well expressed sentence structure (syntax) and grammar</p>	<p>10%</p>
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## Exam specification

AO weightings per exam

AO	Component 021/ 521 weighting (approx. %)
<p>AO1 Recalls knowledge from across the breadth of the qualification.</p>	<p>38</p>
<p>AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.</p>	<p>42</p>
<p>AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.</p>	<p>20</p>



The way the exam covers the content of the qualification is laid out in the table below:

**Assessment type:** Examiner marked, written exam, usually delivered online\*

**Assessment conditions:** Invigilated examination conditions

**Grading:** X/P/M/D

<b>021/ 521</b>		<b>Duration: 1.5 hours</b>	
<b>Unit</b>	<b>Unit Title</b>	<b>Number of marks</b>	<b>%</b>
Unit 202	Working in the horticulture industry	4	10
Unit 203	Plant naming, identification, selection and science	13	33
Unit 204	Preparation, planting and maintenance of plants	12	30
Unit 206	Horticultural business practice	3	7
N/A	Integration across the units	8	20
<b>Total</b>		<b>40</b>	<b>100</b>

\*These exams are sat under invigilated examination conditions, as defined by the JCQ:

**<http://www.jcq.org.uk/exams-office/ice--instructions-for-conducting-examinations>**

Entry for exams can be made through the City & Guilds Walled Garden.

## 6 Moderation and standardisation of assessment

City & Guilds' externally set assignments for technical qualifications are designed to draw from across the qualifications' content, and to contribute a significant proportion towards the learner's final qualification grade. They are subject to a rigorous external quality assurance process known as external moderation. This process is outlined below. For more detailed information, please refer to 'Marking and moderation - Technicals centre guidance' available to download on the City & Guilds website.

It is vital that centres familiarise themselves with this process, and how it impacts on their delivery plan within the academic year.

### Supervision and authentication of internally assessed work

The Head of Centre is responsible for ensuring that internally assessed work is conducted in accordance with City & Guilds' requirements.

City & Guilds requires both tutors and candidates to sign declarations of authenticity. If the tutor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

### Internal standardisation

For internally marked work<sup>4</sup> the centre is required to conduct internal standardisation to ensure that all work at the centre has been marked to the same standard. It is the Internal Quality Assurer's (IQA's) responsibility to ensure that standardisation has taken place, and that the training includes the use of reference and archive materials such as work from previous years as appropriate.

### Provision for reworking evidence after submission for marking by the tutor

It is expected that in many cases a candidate who is struggling with a specific piece of work may themselves choose to restart and rectify the situation during their normal allocated time, and before it gets to the stage of it being handed in for final marking by the tutor.

In exceptional circumstances however, where a candidate has completed the assignment in the required timescales, and has handed it in for marking by the tutor but is judged to have significantly underperformed, may be allowed to rework or supplement their original evidence for remarking prior to submission for moderation. For this to be allowed, the centre must be confident that the candidate will be able to improve their performance without additional feedback from their tutor and within the required timescales ie the candidate has shown they can perform sufficiently better previously in formative assessments.

The reworked and/or supplemented original evidence must be remarked by the tutor in advance of the original moderation deadline and the moderator informed of any candidates who have been allowed to resubmit evidence.

The process must be managed through the IQA. The justification for allowing a resubmission should be recorded and made available on request. The use of this provision will be monitored by City & Guilds.

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<sup>4</sup> For any internally assessed optional unit assignments, the same process must be followed where assessors must standardise their interpretation of the assessment and grading criteria.

## Internal appeal

Centres must have an internal process in place for candidates to appeal the marking of internally marked components, ie the synoptic assignment and any optional unit assignments. This must take place before the submission of marks for moderation. The internal process must include candidates being informed of the marks (or grades) the centre has given for internally assessed components, as they will need these to make the decision about whether or not to appeal.

Centres cannot appeal the outcome of moderation for individual candidates, only the moderation process itself. A request for a review of the moderation process should be made to **appeals@cityandguilds.com**.

## Moderation

Moderation is the process where external markers are standardised to a national standard in order to review centre marking of internally marked assessments. These markers are referred to as 'moderators'. Moderators will mark a representative sample of candidates' work from every centre. Their marks act as a benchmark to inform City & Guilds whether centre marking is in line with City & Guilds' standard.

Where moderation shows that the centre is applying the marking criteria correctly, centre marks for the whole cohort will be accepted.

Where moderation shows that the centre is either consistently too lenient or consistently too harsh in comparison to the national standard, an appropriate adjustment will be made to the marks of the whole cohort, retaining the centre's rank ordering.

Where centre application of the marking criteria is inconsistent, an appropriate adjustment for the whole cohort may not be possible on the basis of the sample of candidate work. In these instances a complete remark of the candidate work may be necessary. This may be carried out by the centre based on feedback provided by the moderator, or carried out by the moderator directly.

Moderation applies to all internally marked assignments. Following standardisation and marking, the centre submits all marks and candidate work to City & Guilds via the moderation platform. The deadline for submission of evidence will be available on the City & Guilds Walled Garden. See the *Marking and moderation - Technicals Centre Guidance* document for full details of the requirements and process.

In most cases candidate work will be submitted directly to the moderator for moderation. This includes written work, photographic and pictorial evidence, or video and audio evidence. For some qualifications there will be a requirement for moderators to visit centres to observe practical assessments being undertaken. This will be for qualifications where the assessment of essential learner skills can only be demonstrated through live observation. The purpose of these visits is to ensure that the centre is assessing the practical skills to the required standards, and to provide the moderators with additional evidence to be used during moderation. These visits will be planned in advance with the centre for all relevant qualifications.

## Post-moderation procedures

Once the moderation process has been completed, the confirmed marks for the cohort are provided to the centre along with feedback from the moderator on the standard of marking at the centre, highlighting areas of good practice, and potential areas for improvement. This will inform future marking and internal standardisation activities.

City & Guilds will then carry out awarding, the process by which grade boundaries are set with reference to the candidate evidence available on the platform.

### **Centres retaining evidence**

Centres must retain assessment records for each candidate for a minimum of three years. To help prevent plagiarism or unfair advantage in future versions, candidate work may not be returned to candidates. Samples may however be retained by the centre as examples for future standardisation of marking.

## 7 Grading

### Awarding individual assessments

Individual assessments will be graded, by City & Guilds, as pass/merit/distinction where relevant. The grade boundaries for pass and distinction for each assessment will be set through a process of professional judgement by technical experts. Merit will usually be set at the midpoint between pass and distinction. The grade descriptors for pass and distinction, and other relevant information (eg archived samples of candidate work and statistical evidence) will be used to determine the mark at which candidate performance in the assessment best aligns with the grade descriptor in the context of the qualification's purpose. Boundaries will be set for each version of each assessment to take into account relative difficulty.

Please note that as the Merit grade will usually be set at the arithmetical midpoint between Pass and Distinction, there are no descriptors for the Merit grade for the qualification overall.

### Grade descriptors

#### To achieve a pass, a candidate will be able to

- Demonstrate the knowledge and understanding required to work in the occupational area, its principles, practices and legislation.
- Describe some of the main factors impacting on the occupation to show good understanding of how work tasks are shaped by the broader social, environmental and business environment it operates within.
- Use the technical industry specific terminology used in the industry accurately.
- Demonstrate the application of relevant theory and understanding to solve non-routine problems.
- Interpret a brief for complex work related tasks, identifying the key aspects, and showing a secure understanding of the application of concepts to specific work related tasks.
- Carry out planning which shows an ability to identify and analyse the relevant information in the brief and use knowledge and understanding from across the qualification (including complex technical information) to interpret what a fit for purpose outcome would be and develop a plausible plan to achieve it.
- Achieve an outcome which successfully meets the key requirements of the brief.
- Identify and reflect on the most obvious measures of success for the task and evaluate how successful they have been in meeting the intentions of the plan.
- Work safely throughout, independently carrying out tasks and procedures, and having some confidence in attempting the more complex tasks.

#### To achieve a distinction, a candidate will be able to

- Demonstrate the excellent knowledge and understanding required to work to a high level in the occupational area, its principles, practices and legislation.
- Analyse the impact of different factors on the occupation to show deep understanding of how work tasks are shaped by the broader social, environmental, and business environment it operates within.
- Demonstrate the application of relevant theory and understanding to provide efficient and effective solutions to complex and non-routine problems.
- Analyse the brief in detail, showing confident understanding of concepts and themes from across the qualification content, bringing these together to develop a clear and stretching plan, that would credibly achieve an outcome that is highly fit for purpose.
- Achieve an outcome which shows an attention to detail in its planning, development and completion, so that it completely meets or exceeds the expectations of the brief to a high standard.

- Carry out an evaluation in a systematic way, focussing on relevant quality points, identifying areas of development/improvement as well as assessing the fitness for purpose of the outcome.

## Awarding grades and reporting results

The overall qualification grade will be calculated based on aggregation of the candidate's achievement in each of the assessments for the mandatory units, taking into account the assessments' weighting. The **City & Guilds Level 2 Technical Certificate in Horticulture** will be reported on a four grade scale: Pass, Merit, Distinction, Distinction\*.

All assessments **must** be achieved at a minimum of Pass for the qualification to be awarded. Candidates who fail to reach the minimum standard for grade Pass for an assessment(s) will not have a qualification grade awarded and will not receive a qualification certificate.

The approximate pass grade boundary for the synoptic assignment(s) in this qualification are:

Synoptic Assignment	Pass Mark (%)
021	40

Please note that each synoptic assignment is subject to an awarding process before final grade boundaries are confirmed.

The health and safety assessment 201 must be passed to achieve the qualification. This assessment is graded pass/fail.

The contribution of assessments towards the overall qualification grade is as follows:

Assessment method	Grade scale	% contribution
Synoptic Assignment	X/P/M/D	60%
Theory Exam	X/P/M/D	40%

Both synoptic assignments and exams are awarded (see 'Awarding individual assessments', at the start of Section 7, above), and candidates' grades converted to points. The minimum points available for each assessment grade is listed in the table below. A range of points between the Pass, Merit and Distinction boundaries will be accessible to candidates. For example a candidate that achieves a middle to high Pass in an assessment will receive between 8 and 10 points, a candidate that achieves a low to middle Merit in an assessment will receive between 12 and 14 points. The points above the minimum for the grade for each assessment are calculated based on the candidate's score in that assessment.

	Pass	Merit	Distinction
Assignment: 60%	6	12	18
Exam: 40%	6	12	18

The candidate's points for each assessment are multiplied by the % contribution of the assessment and then aggregated. The minimum points required for each qualification grade are as follows:

<b>Qualification Grade</b>	<b>Points</b>
Distinction*	20.5
Distinction	17
Merit	11
Pass	6

Candidates achieving Distinction\* will be the highest achieving of the Distinction candidates.

## 8 Administration

Approved centres must have effective quality assurance systems to ensure valid and reliable delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality assurance procedures.

Consistent quality assurance requires City & Guilds and its associated centres to work together closely; our Quality Assurance Model encompasses both internal quality assurance (activities and processes undertaken within centres) and external quality assurance (activities and processes undertaken by City & Guilds).

For this qualification, standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation.

In order to carry out the quality assurance role, Internal Quality Assurers (IQAs) must have, and maintain, an appropriate level of technical competence and have recent relevant assessment experience. For more information on the requirements, refer to *Section 2: Centre requirements* in this handbook.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- suitable training of staff involved in the assessment of the qualification to ensure they understand the process of marking and standardisation
- completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken place
- the completion by candidates and supervisors/tutors of the record form for each candidate's work.

### External quality assurance

City & Guilds will undertake external moderation activities to ensure that the quality assurance criteria for this qualification are being met. Centres must ensure that they co-operate with City & Guilds staff and representatives when undertaking these activities.

City & Guilds requires the Head of Centre to:

- facilitate any inspection of the centre which is undertaken on behalf of City & Guilds
- make arrangements to receive, check and keep assessment material secure at all times,
- maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential and
- keep completed assignment work and examination scripts secure from the time they are collected from the candidates to their dispatch to City & Guilds.

### Enquiries about results

The services available for enquiries about results include a review of marking for exam results and review of moderation for internally marked assessments.

For further details on enquiries and appeals process and for copies of the application forms, please visit the **appeals page** of the City & Guilds website at **[www.cityandguilds.com](http://www.cityandguilds.com)**.



## Re-sits and shelf-life of assessment results

For the synoptic theory exam and synoptic assignment, candidates who have failed an assessment or wish to re-take it in an attempt to improve their grade, can re-sit assessments **once only**. The best result will count towards the final qualification. See guidance on individual assessment types and re-sit conditions in Section 5.

## Factors affecting individual learners

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Customer Services of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

## Malpractice

Please refer to the City & Guilds guidance notes *Managing cases of suspected malpractice in examinations and assessments*. This document sets out the procedures to be followed in identifying and reporting malpractice by candidates and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of candidate and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of candidate malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another candidate (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (eg disqualification from the assessment) will be applied.

Where suspected malpractice is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. Please refer to the form in the document *Managing cases of suspected malpractice in examinations and assessments*.

## Access arrangements and special consideration

Access arrangements are adjustments that allow candidates with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before assessment takes place.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds* for more information. Both are available on the City & Guilds website: **<http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments>**

### **Special consideration**

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is available on the City & Guilds website: **<http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments>**

<b>Level:</b>	2
<b>GLH:</b>	30

### What is this unit about?

The purpose of this unit is for learners to understand the principles and importance of health and safety within land-based settings. This unit covers health and safety legalisation which provides the requirements upon which policies and procedures within the industry are based.

Working in land-based roles is exciting and varied but operating in these environments can be dangerous and present potential risks and hazards. As part of this unit learners will look at the legislation that is in place to maintain safety, the requirements for risk assessment and how these impact on working practices.

This unit also introduces learners to the basic requirements of fire prevention, safe manual handling and basic first aid.

Learners should consider the following questions as a starting point to this unit:

- What is the difference between a hazard and a risk?
- What legislation covers health and safety when working in land-based environments?
- How should heavy materials or equipment be moved safely?
- What different types of fire prevention equipment are there?

This unit must be taught alongside **all** technical units within the qualification ensuring learners gain an appreciation of its importance and so that they are equipped with knowledge and understanding to protect themselves and others when working in the industry.

### Learning outcomes

In this unit, learners will:

1. Understand the impact legislation has on land-based industries
2. Understand risk assessment requirements for land-based industries
3. Understand safe working practices when working in land-based industries.

## Learning outcome:

1. Understand the impact legislation has on land-based industries

## Topics

- 1.1 Legislation relevant to land-based industries
- 1.2 Employer and employee responsibilities

### Topic 1.1

The following legislation applies in the land-based sector. For purposes of assessment, there is no requirement for detail, but learners must appreciate that there is legislation and where each applies.

Legislation:

- Health and Safety at Work Act etc (HASAW) (1974)
- Provision and Use of Work Equipment Regulations (PUWER) (1998)
- Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR) (2013)
- Control of Substances Hazardous to Health (COSHH) Regulations (2002)
- Management of Health and Safety at Work Regulations (1999)
- Personal Protective Equipment Regulations (PPE) (1992)
- Regulatory Reform (Fire Safety) Order (2005)
- Environmental Protection Act

NB - Health and safety relating to specific tasks/practices will be covered within the relevant unit.

### Topic 1.2

Employer responsibilities under health and safety regulations:

- Providing healthy work environment:
  - Washing facilities
  - Toilets
  - Ventilation
  - Heating and lighting
  - No smoking policy
  - First aid
- Providing safe work environment:
  - Signage
  - Personal Protective Equipment (PPE)
  - Fire safety
  - Risk assessments
  - Safe equipment
- Training
- Reporting

Employee responsibilities where health and safety legislation applies:

- Responsibility for own personal health and safety
- Co-operation with employer
- Not interfering with or misusing equipment/provisions (e.g. alarms, signage) provided for health, safety and welfare
- Lines of reporting for:

- Accidents
- Faults
- Damage
- Following instructions and safe working practice (using PPE where provided)
- Helping others and sharing good practice

### **Learning outcome:**

2. Understand risk assessment requirements for land-based industries

### **Topics**

- 2.1 Risk assessment terminology
- 2.2 Hazards, risks and control measures

#### **Topic 2.1**

Definitions of risk assessment terminology:

- Generic risk assessment
- Site specific
- Task specific
- Emergency action plan
- Method statement
- Hazard
- Risk
- Persons at risk (yourself, colleagues, general public)
- Control measures

#### **Topic 2.2**

The five step process for risk assessments:

- Identifying hazards
- Deciding who might be harmed and how
- Evaluating risks, deciding on precautions
- Recording finding and implementing
- Reviewing as required

## Learning outcome:

3. Understand safe working practices when working in land-based industries

### Topics

- 3.1 Manual handling principles
- 3.2 Basic first aid procedures
- 3.3 Fire safety principles

#### Topic 3.1

Principles of and techniques for manual handling, and consequences of not following:

- Legislative requirement
- Safe lifting techniques
- Use of mechanical aids
- Potential implications of poor manual handling – back injury, dropped and damaged goods/equipment
- That it is covered by manual handling risk assessment

#### Topic 3.2

First aid situations:

- Wounds/severe bleeding
- Burns
- Shock
- Unconsciousness
- Falls from height

Response to first aid situations:

- Procedures to be taken
- How and when to call for assistance
- Reporting requirements
- Own limitations when responding to first aid emergency/emergencies

#### Topic 3.3

Principles of fire safety, procedures to follow, and fire safety equipment and their uses:

- Procedures for raising the alarm
- Evacuations and drills
- Types and uses of fire safety equipment:
  - Smoke detectors
  - Fire alarms
  - Fire extinguishers (water, dry powder, foam, CO2)
  - Fire blankets
  - Fire hoses
- Own limitations when responding to potential fire emergency/emergencies

## Guidance for delivery

This unit links closely with all other units and provides the basis of knowledge required to work safely on all tasks in the range of land-based environments. Tutors should guide learners to develop their understanding of the principles of health and safety required for working within the industry as learners will need to understand how these are essential for employment within the sector.

This is a knowledge only unit and although the majority of content could be delivered in a classroom environment, it is important that learners can relate this knowledge and understanding to real life working tasks and environments. Reference to this unit should be made when teaching the other practical units that make up this qualification.

It is expected that a range of delivery methods will be used including presentations, classroom discussions and individual study.

Topic 1.1 relates to legislation - there is no requirement for a detailed understanding at this level, but learners must appreciate where there is legislation, what it is and where each applies. Tutors should ensure that they keep up to date with changes and amendments to legislation covered by this unit and include delivery of locally relevant policy and standards where applicable.

## Suggested learning resources

### Websites

Health and Safety Executive (HSE)

[www.hse.gov.uk](http://www.hse.gov.uk)

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<b>Level:</b>	2
<b>GLH:</b>	30

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**What is this unit about?**

The horticulture industry is diverse and provides a wide range of career opportunities. It is important for those working in the industry to understand how it is organised and the professional standards required for those working in it.

The aim of this unit is to provide the learner with knowledge of the industry structure and the types of organisations that operate within it. Learners will understand their roles and responsibilities in supporting a business to achieve its commercial objectives.

As part of the unit requirements, learners must achieve 150 hours of work experience within the industry. This requirement is subject to external quality assurance through sampling of learner evidence, which must be provided by centres upon request by City & Guilds.

**Learning outcomes**

In this unit, learners will be able to:

1. Know the structure of the horticulture industry
2. Know employment rights and responsibilities
3. Understand the organisation of business



## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Know the structure of the horticulture industry

### Topics

- 1.1 Job roles
- 1.2 Industry associations
- 1.3 Industry events

#### Topic 1:1

Duties of different roles in the horticulture industry:

- Gardener
- Landscaper
- Public and private parks, gardens and open spaces
- Groundsman/ greenkeeper
- Garden centre/ retail assistant
- Commercial nursery worker
- Supervisor
- Manager
- Self-employed/ business owner

#### Topic1:2

Roles of industry associations and support they offer:

- British Association of Landscape Industries (BALI)
- Horticulture Trade Association (HTA)
- Royal Horticultural Society (RHS)
- Green Keeping Training Committee (GTC)
- Chartered Institute of Horticulture (CiofH)
- Institute of Groundsmanship (IoG)
- Association of Professional Landscapers (APL)
- Perennial

#### Topic 1:3

Purpose, activities involved and key dates for industry events:

- Cereals
- Saltex
- RHS shows
- BTME Harrogate
- Ideal Home Show
- The Landscape Show
- World Skills
- Young Hort

### Learning outcome:

2. Know employment rights and responsibilities

## Topics

- 2.1 Employment rights
- 2.2 Employee responsibilities

### Topic 2:1

Employment rights of employees:

- Safe working environment
- Training
- Rest Periods
- Holidays
- Minimum wage
- Living wage
- Contract of payment

### Topic 2:2

Employee responsibilities:

- Punctuality
- Safety of others
- Maintain the working environment

## Learning outcome:

- 3. Understand the organisation of business

## Topics

- 3.1 Business structures
- 3.2 Organisational policies
- 3.3 Promotion of the organisation

### Topic 3:1

Organisational hierarchies and cultures of different types of business:

- Sole trader
- Limited company
- Partnership
- Franchise
- Chain

### Topic 3:2

Content of different types of policies:

- Health and safety
- Complaints
- Dress code
- Use of social media
- Attendance
- Store presentation
- Professional standards

### Topic 3.3

Suitability of types of promotion:

- Displays
- Posters
- Leaflets
- Websites
- Social media
- Events (plant fairs, specialist shows, markets, demonstrations, craft fair)

Implications of social media:

- Use of personal social media
- Negative social media comments
- e-safety

## Guidance for delivery

Learners on centre-based courses should have experience of the type of work that they hope to do and of the expectations of potential future employers. Some level 2 learners are likely to already have experience of working in the horticulture industry, so this unit seeks to provide new experience opportunities for these learners.

This unit should be undertaken in a real business environment relevant to the subject interest of the learner but work experience may be gained by a number of routes, e.g. as part of an industrial placement whilst within the programme, whilst working on a planned daily or weekly basis on the centre's commercial and/or educational facilities, whilst undertaking voluntary work within the industry, or as a member of a group of learners invited to carry out practical work on a suitable business.

Any Act or legislation that is sector specific should be adhered to.

Learners must complete 150 hours work experience. Centres should be mindful of their responsibilities for ensuring that work placements have appropriate supervision, insurance and health and safety policies in place and that learners have access to appropriate support whilst on placement. This requirement is subject to external quality assurance through sampling of learner evidence, which must be provided by centres upon request by City & Guilds.

Provided it meets the requirements detailed in the Qualification Handbook and the Employer Involvement Centre Guidance, this work experience can also count as the meaningful employer involvement component that all learners are also required to undertake.

In these instances, centres must record work experience activities on the Employer Involvement Planner and Tracker and retain records confirming each learner's attendance at these placements. These must be made available to City & Guilds if required, as part of our standard quality assurance monitoring.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the centre has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the horticulture industry that may be able to help with of the currency of legislation, policies and codes of practice used in the taught content.

## Suggested learning resources

### Websites

British Association of Landscape Industries (BALI)	<a href="http://www.bali.org.uk">www.bali.org.uk</a>
Horticulture Trade Association (HTA)	<a href="http://www.hta.org.uk">www.hta.org.uk</a>
Royal Horticultural Society (RHS)	<a href="http://www.RHS.org.uk">www.RHS.org.uk</a>
Green Keeping Training Committee (GTC)	<a href="http://www.the-gtc.co.uk">www.the-gtc.co.uk</a>
Chartered Institute of Horticulture (CiofH)	<a href="http://www.horticulture.org.uk">www.horticulture.org.uk</a>
Institute of Groundsmanship (IoG)	<a href="http://www.iog.org.uk">www.iog.org.uk</a>
Association of Professional Landscapers (APL)	<a href="http://www.landscaper.org.uk">www.landscaper.org.uk</a>
Perennial	<a href="http://www.perennial.org.uk">www.perennial.org.uk</a>

## Unit 203

## Plant naming, identification, selection and science

<b>Level:</b>	2
<b>GLH:</b>	30

### What is this unit about?

The purpose of this unit is to provide learners with the basic knowledge and skills to name and identify plants incorporating aspects of plant science.

### Learning outcomes

In this unit, learners will be able to:

1. Understand the naming of plants
2. Identify and select plants
3. Understand plant growth and development

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Understand the naming of plants

### Topics

- 1.1 Terms used in the binomial system
- 1.2 Purpose and importance of botanical names
- 1.3 How descriptive common names can aid identification
- 1.4 Characteristics and parts of plants

#### Topic 1.1

Terminology used:

- Family
- Genus
- Species
- Cultivar
- Hybrid

#### Topic 1.2

Purpose and importance of botanical names:

- Common names vary with location; one common name may be used for several plants, one plant may have several common names.
- There is a need for one standard name that positively identifies the plant world-wide to avoid confusion, accidental poisoning and to be scientifically accurate.
- A plant needs a scientific (Botanical name) name before it can be protected in law.

#### Topic 1.3

Descriptive common names:

- Habit (prostrate, horizontal, fastigiated, columnar, weeping, round, irregular)
- Size
- Shape
- Preferred habitat.

Identification by:

- Leaf shape
- Apex
- Margins
- Colour and arrangement
- Bud shape
- Size and arrangement (opposite or alternate)
- Stem colour and texture
- Stem and leaf modifications

- Flowers and fruit
- Colour shape
- Size
- Flower morphology
- Type of inflorescence
- Scent and fruit

#### Topic 1.4

Plant characteristics:

- Monocotyledons/ dicotyledons
- Woody evergreen/deciduous plants
- RHS zones H1 – H8 (hardy/half hardy/tender)

#### Learning outcome:

2. Identify and select plants

#### Topics

- 2.1 Identify and botanically name plants
- 2.2 Functions and uses of plants in horticulture

#### Topic 2.1:

Range: A minimum of thirty from each category using their full scientific name, for three of the following:

- Bedding plants
- House plants
- Trees
- Shrubs
- Grasses
- Food crops

Identifying and botanically naming plants using the correct format and reference materials appropriate to industry.

Correct format:

- Capital letter for Genus
- Lower case letter for species and variety
- Single speech marks
- Capital letter throughout cultivar names; *Berberis thunbergii* 'Rose Glow'. If in doubt tutors should follow RHS guidelines.
- Correct symbols as necessary; *Primula* x *kewensis*, x *Cuprocyparis leylandii* and + *Laburnocytisus adamii*

Plant's characteristics:

- Habit (prostrate, horizontal, fastigiated, columnar, weeping, round, irregular)
- Size
- Shape and form
- Leaf shape, apex and margins

- Colour and arrangement
- Bud shape, height, spread and arrangement (opposite or alternate)
- Stem colour and texture
- Seasonal interests
- Stem and leaf modifications
- Flowers and fruit
- Type of inflorescence

Utilise reference material to aid plant identification:

- Text books
- Identification keys

## Topic 2.2

Functional characteristics of plants:

- Shelter
- Shade
- Screening
- Privacy
- Structure
- Soil/bank stabilisation
- Noise abatement
- Provision of specific surfaces (amenity, sport)
- Habitat
- Food for wildlife
- Security
- Creation/prevention of access and desire lines
- Tolerance to specific pollution and climate factors (coastal)
- Tolerance to specific soil factors (pH, drainage, arid, wet, bog, depth)

Specific requirements:

- Soil preferences (moisture, drainage, dry, wet, bog, nutrition, pH)
- Site factors/ aspect (exposure, shelter, pollution, salt, frost, light/sun, shade, growing season, temperature extremes)

Categories of plants:

- Trees (broad-leaved, coniferous, forestry, amenity, domestic garden, parkland), native, introduced
- Shrubs – deciduous, evergreen, native, introduced, open-ground and container-grown
- Bedding plants – bulbs, corms, rhizomes, stem tubers, hardy, tender, open-ground and container-grown/containerised, hardy and half-hardy, wildflower mixtures
- Food crops – soft and top fruit, vegetables, salads
- Grasses – from seed or turf, amenity, sports turf, ornamental, container-grown
- House plants

### Learning outcome:

3. Understand plant growth and development

### Topics

- 3.1 Organs of plants and their function
- 3.2 Life cycles of plants



### **Topic 3.1**

Organs of plants:

- Roots (fibrous, tap and tuberous)
- Leaves (petiole, lamina, midrib, veins)
- Stems (woody and non-woody)
- Buds
- Flowers (petals, sepals, anthers, filament, style, stigma, ovary, bract)

Functions:

- Leaves: produce food by photosynthesis, carry out transpiration
- Stems: provide support for the leaves, flowers and fruit, provide a transport system around the plant for water, nutrients and food
- Roots: anchor the plant in the soil, absorb water and nutrients from the soil
- Flowers: pollination, fertilisation and seed and fruit formation

### **Topic 3.2**

Definition of the categories:

- Annuals
- Ephemeral
- Biennials
- Herbaceous perennials
- Woody perennials

## Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of plants from the range. It is expected to incorporate a mixture of lectures, visits to botanical establishments such as garden centres, botanical gardens, national plant collections or arboretums. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice. This unit could be delivered alongside unit 202 Working in the horticulture industry.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- A Handbook for Horticultural Students.* Rushden: Dawson P. Dawson. 2006.  
ISBN: 0-9525911-11.
- Applied Principles of Horticultural Science.* 2<sup>nd</sup> ed. Brown L. Oxford: Butterworth-Heinemann. 2002.  
ISBN: 9-780-75068-702-7.
- Biology, a functional approach fourth edition.* 4<sup>th</sup> ed. Roberts M. Cheltenham: Nelson Thornes. 1986.
- Botany for Degree Students.* 6<sup>th</sup> ed. Dutta A C. New Delhi: OUP India.1997.
- Flora of the British Isles.* 2<sup>nd</sup> ed. Clapham AR, Tutin TG and Warburg EF. Cambridge: Press Syndicate University of Cambridge. 1962.
- Grasses: v. 1: A Guide to Their Structure, Identification, Uses and Distribution.* . London: Penguin Books. 3rd ed. 1992. Hubbard CE.

- Herbaceous perennials.* McIndoe A and Hobbs K.  
Devon: David and Charles. 2005  
ISBN: 0-71532-024-6.
- Perennial garden plants or the Modern Florilegium.* Thomas G. S.  
London: Frances Lincoln Limited. 2004.  
ISBN: 0-71122-403-X
- Perennials: Early Perennials v. 1: Early Perennials  
Vol 1.* London: Pan Books. 1993 Phillips R and Rix M.
- Plant physiology.* 4<sup>th</sup> ed. Salisbury FB and Ross C.  
Florence: Brooks Cole. 1991.
- Principles of Horticulture.* Adams CR.  
Oxford: Butterworth-Heinemann 2008.  
ISBN: 9-780-75068-694-5.
- Science and the Garden: the scientific basis of  
horticulture practice.* 2<sup>nd</sup> ed. Ingram DS, et al.  
Sussex: Wiley Publishing. 2008.  
ISBN-13: 978-1-4051-6063-6
- The Hillier Manual of Trees and Shrubs.* 3<sup>rd</sup> ed. Hillier J and Coombes A J.  
Devon: David and Charles. 2007
- The RHS Encyclopaedia of Gardening.* 2<sup>nd</sup> ed. Brickell C.  
Surrey: Dorling Kindersley Publishers. 2002.
- Trees in Britain, Europe and North America.* Phillips R. and Grant, S.  
London: Pan Books. 1978.
- Woodlands: A practical handbook.* Agate, E.  
London: British Trust for Conservation Volunteers.  
2002 ISBN: 0-94675-233-8.

## Journals

Brochures from hardy plant nurseries in UK and Europe are also useful.  
STRI pamphlet, Turfgrass Seed 2009.

## Websites



<b>Level:</b>	2
<b>GLH:</b>	60

### **What is this unit about?**

The purpose of this unit is to provide learners with the knowledge and skills to prepare growing mediums, such as soil, for potting and planting and to maintain them. This unit also covers turf in green spaces, including wild flowers.

### **Learning outcomes**

In this unit, learners will be able to:

1. Understand the basic principles of soil and growing media
2. Cultivate soil and growing media to receive plants
3. Planting and potting plants
4. Establish grassed areas from seed and turf
5. Maintain grassed areas

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Understand the basic principles of soil and growing media

### Topics

- 1.1 Types of soil and growing media
- 1.2 Analyse soil and growing media to determine texture, structure and pH
- 1.3 Structure, texture and fertility

#### Topic 1.1

Range: soil and any growing media (bark, composted bark, loam, peat, coir)

Horizons in a soil profile:

- Organic layer, top-soil, sub-soil, parent material
- O- organic layer, A - topsoil, B - subsoil, C – (parent material) bedrock, winter water table, drainage characteristics
- Soil profile pit, extending to sufficient depth to expose soil profiles O, A, B, and C

#### Topic 1.2

Textural class:

- Components of soils, clay, silt, sand, loam
- Soil texture test

pH:

- Soils/ growing media: neutral, acid, alkali
- Collection and preparation of samples: pH testing kit to determine relative alkalinity/acidity

#### Topic 1.3

Formation:

- Weathering agents
- transporting agent
- parent material

Characteristics, texture and component parts:

- Components: sand, gravel, loam, clay, organic matter, soil organisms, air and water, importance of air in the soil, contribution of soil organisms to fertility

Soil structure and fertility:

- Organic matter/humus content
- Application management
- Diversity and quantity of soil organisms (invertebrates, vertebrates, fungi, bacteria)
- Contributions made by each

## Learning outcome:

2. Cultivate soil and growing media to receive plants

## Topics

- 2.1 Assess a site and identify hazards
- 2.2 Prepare land for planting to required tilth
- 2:3 Select and prepare growing media

### Topic 2.1:

Basic site analysis carried out to determine the ground preparation required:

- Identifying the need for and requirement of initial site clearance of unwanted plant material and general debris.
- Determine soil type e.g. clay loam, sandy loam, to ascertain preparation techniques and soil improvement needs.
- Soil texture, structure, pH and ground conditions of the planting site should be ascertained to influence decision making process

Hazards:

- Permanent hazards such as overhead power lines and underground services, access routes, machine related hazards
- Check for temporary/site specific hazards, such as those brought on by inclement weather and possible site contamination.
- Site hazards to be identified for the avoidance of planting and establishment problems and to ensure safe working

### Topic 2.2:

Land to be prepared by hand and by pedestrian operated machines in a safe and appropriate manner, adhering to manufacturer's instructions:

- Primary and secondary hand cultivation
- Weed control and removal
- Single and double digging as appropriate
- Raking, treading, levelling and tilth production
- Soil amelioration (organic matter, sand)
- Application of appropriate fertilisers

### Topic 2.3

Preparation of growing media:

- Selection of several growing media
- Estimate quantities required
- Mix either by hand or machine incorporating fertilisers.

## Learning outcome:

3. Planting and potting plants

## Topics

- 3.1 Planting and potting plants
- 3.2 Immediate aftercare for post planting and potting

Range: Trees and shrubs, herbaceous perennials and seasonal bedding

### **Topic 3.1**

Appropriate condition of plant:

- Moist roots/root-ball
- Free from pests and diseases
- Physical damage
- Containerised and container grown plants – bare root (trees)
- Not root-bound
- Correct size /even grade/ typical features (reference to British Standards – Nursery Stock categories)

Planting and potting:

- Depth of cultivation/planting/ potting
- Correct techniques used (hole planting, supporting/staking) and required firming for different plant types
- Application of appropriate fertiliser to aid establishment if required
- Possible planting through weed suppressant geotextile material
- Storage of plant prior to planting and potting

Planting depth and firming:

- Techniques and benefits to be identified (are tree/shrubs planted at same depth as in nursery)
- Keep top soil separate from sub soil when taking out planting hole, top soil to be returned around the roots first
- Firm soil around plants to ensure roots are in contact with the surrounding soil
- Firming also helps to secure plant in the ground

### **Topic 3.2**

Immediate aftercare:

- Watering
- Supporting /staking
- Mulching
- Labelling
- Weed control as appropriate to requirements
- Soil conditions and time of year



## Learning outcome:

4. Establish grassed areas from seed and turf

## Topics

- 4.1 Prepare ground to receive grass seed or turf
- 4.2: Calculate the required amount of seed and sow evenly
- 4:3 Lay turf safely

Range: amenity, ornamental and wild flower

### Topic 4.1

Preparation of ground:

- Clear site of debris and unwanted material including stones prior to commencing ground preparation, which is to include all secondary cultivation (forking, raking level, stone removal for fine turf, consolidation and development of appropriate tilth)
- The accuracy of the level (avoidance of depressions) and sufficiency of consolidation
- Application of a base fertiliser (if appropriate) to the site at the recommended rate may be required
- The need for a weed and weed-seed free root zone
- Control techniques should include cultural methods (digging out by hand/mechanical, thermal weeding, and exhaustion); also chemical controls (contact and translocated herbicides)

### Topic 4.2

Estimate the required amount of seed:

- The application rate will vary with the time of year and the species mix (30 grams per metre squared is a general guide for amenity sowings).
- Refer to suppliers recommendations for suggested application rates per seed mix.
- Calculate area of lawn to be created in square metres and multiply by application rate (grams per square metres) to determine quantity.

Sow seed evenly and at the correct density:

- The correct amount of seed is to be weighed/measured out
- Stirred to mix the species and sown evenly over the area
- It is anticipated that the seed will be sown by hand and marking the area into metre squares will be of benefit. The seed should be sown half in one direction and the other half at 90°.
- The application rate will vary with the time of year and the species mix.
- Some species germinate faster than others and will shade out the slower germinating species if the application rate is too high.
- A high density of germinating, soft growth will produce more seedling disease and a slower rate to maturity.
- Seed should normally be lightly raked into the surface following sowing, avoiding disturbing soil/ground levels already created, the area may require protection from birds.

### Topic 4:3

Lay turf:

- Assess that delivered turf is of an appropriate quality (check for presence of pests and diseases weeds and general damage to turfs)
- Care should be taken with lifting heavy rolls of turf

- Laying of turf from boards, using stretcher pattern with no small pieces at the edge
- Care must be taken not to stretch the turf during handling and the joints must be as small as possible
- The application of a bulky top dressing should be made over the laid turf particularly in the joints and watered in

### Learning outcome:

5. Maintain grassed areas

### Topics

- 5.1 Planning maintenance schedule
- 5.2 Carry out maintenance tasks
- 5.3 Common weeds, pests and diseases control methods

Range: amenity, ornamental and wild flower

#### Topic 5.1

Timing of tasks over a year.

#### Topic 5.2

Maintenance tasks:

- Watering in dry weather, keep people off for a suitable period of time to allow for establishment and avoid damage
- Seed needs gentle rolling to push any small stones into the surface and encourage tillering when the soil conditions permit (dry enough) Topping off with the mower with sharp blades at about 5 cm, depending on the species sown
- Nutritional and pH requirements of new swards
- Frequency and timing of each operation on fine and coarse turf
- Selecting appropriate machines and equipment for the type of turf and use it safely and efficiently.
- Mowing (cylinder and rotary)
- Scarifying
- Aeration
- Application of bulky top dressing and applying irrigation, (it would be beneficial to include fertiliser application, brushing, pest and disease control)
- References to the need for autumn or spring renovation should be made.

#### Topic 5.3

Identification of common weeds, diseases and pests and the control methods.

Common weeds:

- Daisy (*Bellis perennis*)
- Dandelion (*Taraxacum officinale*)
- Creeping buttercup (*Ranunculus repens*)
- White clover (*Trifolium repens*)
- Yarrow (*Achillea millefolium*)
- Greater plantain (*Plantago major* L.)

Common pests:

- Leatherjackets (*Tipula* spp)

- Chafer grubs (*Phyllopertha horticola* and *Hoplia philanthus*)
- Rabbits (*Oryctolagus cuniculus*)

Common diseases:

- Red thread (*Laetisaria fuciformis*)
- Fusarium (*Microdochium nivale*)
- Fairy ring (*Marasmius oreades* and other fungi species)

Controls:

- Chemicals
- Cultural
- Biological

## Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of plants from the range. It is expected to incorporate a mixture of lectures, visits to botanical establishments such as garden centres, botanical gardens, national plant collections or arboretums, and local employers, such as landscapers, local authorities and parks. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice. This unit could be delivered alongside unit 202 Working in the horticulture industry.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

*Grasses: A Guide to their structure, Identification, Uses and Distribution.* Hubbard C.  
London: Penguin Books. 1992.  
ISBN: 0-140-13227-9.

*Lawns, Weeds and Ground Cover.* 2<sup>nd</sup> ed. London: Pycraft D.  
Mitchell Beazley Publishers. 1992.

<i>Machinery for Horticulture.</i> Ipswich: Old Pond Publishing. 1997. ISBN: 0-852-36369-9.	Bell B and Cousins S.
<i>Principles of Horticulture.</i> 5 <sup>th</sup> ed. Oxford: Butterworth Heinemann. 2008. ISBN: 978-0-7506-8694-5.	Adams CR.
<i>RHS Encyclopaedia of Gardening.</i> London: Oxford Publishing Group. 2007	Brickell C.
<i>RHS Pruning and Training.</i> Surrey: Dorling Kindersley Publishers. 2006. ISBN: 1405315265	Brickell C and Joyce D.
<i>Sports Turf and Amenity Grassland Management.</i> Wiltshire: The Crowood Press Ltd. 2005. ISBN: 1-86126-790-8.	Brown S.
<i>The Hillier Manual of Trees and Shrubs.</i> 3 <sup>rd</sup> ed. Devon: David and Charles. 2007. ISBN: 07015326640	Hillier J and Coombes A J.
<i>The Lawn Expert.</i> New York: Sterling Publishing Company. 1997.	Hessayon D.G.
<i>The RHS Encyclopaedia of Gardening.</i> 2 <sup>nd</sup> ed. Surrey: Dorling Kindersley Publishers. 2007. ISBN: 1405322270	Brickell C.
<i>The Tree and Shrub Expert.</i> London: Transworld Publishers. 1999. ISBN: 0903505178	Hessayon D G.
<i>Turf Culture: A complete guide manual for the groundsman.</i> Dorset: Blandford Press. 1990	Hope F.

## Journals

Sports Turf Research Institute (STRI) leaflets and Journals

## Websites

Royal Horticultural Society	<a href="http://www.rhs.org.uk">www.rhs.org.uk</a>
The Institute of Groundsmanship	<a href="http://www.iog.org">www.iog.org</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>

The Green Keepers Training Committee

[www.the-gtc.co.uk](http://www.the-gtc.co.uk)

British and International Golf Greenkeepers  
Association

[www.bigga.org.uk](http://www.bigga.org.uk)

## Unit 205

## Care, maintenance and use of tools, equipment and machinery

<b>Level:</b>	2
<b>GLH:</b>	30

### What is this unit about?

The purpose of this unit is for learners to have the skills and knowledge to use and maintain tools, equipment and machinery used in horticultural tasks.

This unit does not cover the use of chainsaws.

### Learning outcomes

In this unit, learners will be able to:

1. Understand safe working principles when using tools, equipment and machinery
2. Prepare land-based tools, equipment and machinery for use
3. Use and operate tools, equipment and machinery
4. Maintain tools, equipment and machinery

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

This unit does not cover the use of chainsaws. It does cover powered and non-powered machinery, electric, battery and robotic.

Learners should cover a range of tools, equipment and machinery:

Hand tools eg loppers, shears, half moons, and spades

Non-powered machines eg push lawn mower, push seeders, fertiliser spreaders

Powered machines eg lawns mowers, hedge trimmers, shredders, scarifiers, rotivators, tray fillers, potting machine, compact tractors, ride on mowers.

## Learning outcome:

1. Understand safe working principles when using tools, equipment and machinery

## Topics

1:1 Manufacturer's instructions

1:2 Legal and environmental requirements for specified machinery

### Topic 1:1

Manufacturer's instructions, documents and information sources:

- Dealer installation process
- Operator instruction manuals
- Manufacturer web sites

### Topic 1:2

Legislation:

- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- Control of Pesticides Regulations 1986 (COPR)
- Health and Safety at Work etc Act 1974

## Learning outcome

2. Prepare land-based tools, equipment and machinery

## Topics

- 2:1 Carry out checks and adjustments on tools, equipment and machinery to meet specific requirements prior to use

### Topic 2:1

Controls, devices and instruments:

- Operator controls
- Power unit controls
- Manual
- Hydraulic
- Electronic
- Machine adjustment/performance settings - safe start devices, clutches, performance/load limiters
- Seat occupation switches
- Guards – warning lights
- Analogue/digital information

Adjustments that can be made:

- Operator fit
- Working height
- Depth
- Speed
- Calibration
- Tilth
- Work rate

Pre-start checks to be carried out, as appropriate:

- Lubricants
- Cooling
- Fuel level
- Wheel equipment
- Safety guards
- Road legal
- Machine/ vehicle security
- Personal Protective Equipment (PPE)

Fuelling, as appropriate:

- Fuel types
- Fuel contamination checks
- Correct storage
- Machine power isolation
- Ventilation
- Spillage
- Safe areas
- Fire hazards



- Personal Protective Equipment (PPE)

### Learning outcome:

3. Use and operate tools, equipment and machinery

### Topics

- 3:1 Select, use and operate tools, equipment and machinery

#### Topic 3:1

Select, use and operate tools, equipment and machinery for specific tasks and to commercial efficiencies:

Operate, as appropriate:

- Attachment to power unit
- Engagement of power
- Assess test runs and re-adjust
- Site assessment for hazards/risks
- Continuous monitoring of performance
- Over/under lapping

Efficiency, as appropriate:

- Acceptable work rates
- Backup power availability
- Economy of fuel
- Wearing component lifespan

Desired results, as appropriate:

- All area covered
- Correct application rates/tilth of seedbed
- Quality of cut
- Avoid undesirable results (compaction of soil, wheel marks in seedbed)

### Learning outcome:

4. Maintain tools, equipment and machinery

### Topics

- 4:1 Routine maintenance as per manufacturer's instructions
- 4:2 Hazards and risk assessment during maintenance activities
- 4:3 Recording maintenance activities in correct format

#### Topic 4:1

The difference in the working cycles of 2 stroke and 4 stroke petrol and diesel engines.

Routine maintenance, as appropriate:

- Pre-work assessment of machine condition

- Routine periodic maintenance
- Adjustments for wear
- Lubrication
- Replacement components
- Preparation for storage
- Cleaning
- Lubrication and protection

Workshop tools:

- Spanners/sockets and wrenches
- torque wrenches and multipliers
- screwdrivers
- Hammers
- Service gauges and measuring equipment
- Tool kit and on site tool kit

### **Topic 4:2**

Hazards during maintenance activities:

- Identify hazards according to operations
- Machine power isolation
- Machine stability
- Contamination from fuels/ lubricants/ chemicals/ sharps/ heat/ pressure/ fumes
- Personal injury

### **Topic 4:3**

Record maintenance activities:

- Complete maintenance record sheet/job cards
- Record service/maintenance interval/date/work done
- Record replacement of wearing components
- Working life

Appropriate format:

- Manufacturers documentation
- Service record book
- Service record charts
- Company procedures
- Electronic record storage
- Service interval label on machine

## **Guidance for delivery**

During the delivery of this unit, learners should have access to a wide range of equipment and machinery from the range. It is expected to incorporate a mixture of lectures, visits to local employers such as garden centres, landscapers, local authorities, machinery suppliers and machinery manufacturers. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal with a range of industry situations which reflects current industry practice. This unit could be delivered alongside unit 202 Working in the horticulture industry.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- Farm Machinery, 12th edition.* Culpin C.  
Blackwell Scientific. 1992.  
ISBN: 0-632-03159-X
- Farm Machinery. 5<sup>th</sup> e.* Old Bond Publishing. 2005. Bell B.  
ISBN: 1-903-3668-2
- Hillier's Fundamentals of Motor Vehicle Technology. 5<sup>th</sup> ed.* Hillier V and Coombes P.  
Nelson Thornes. 2004.  
ISBN: 0-748-78082-3

### Journals

Horticultural Weekly  
Profi International  
Manufacturers publications, service charts and manuals  
Lubrication charts and data sheets

### Websites

British Agricultural and Garden Machinery Association	<a href="http://www.bagma.com">www.bagma.com</a>
Dept for Environment, Food and Rural Affairs	<a href="http://www.defra.gov.uk">www.defra.gov.uk</a>
Welsh Assembly Government	<a href="http://www.wales.gov.uk">www.wales.gov.uk</a>
Scottish Executive Environment and Rural Affairs Department	<a href="http://www.scotland.gov.uk">www.scotland.gov.uk</a>
Department of Agriculture and Rural Affairs (Northern Ireland)	<a href="http://www.daera-ni.gov.uk">www.daera-ni.gov.uk</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>



<b>Level:</b>	2
<b>GLH:</b>	30

### **What is this unit about?**

The purpose of this unit is for learners to understand the business practices used in horticultural businesses. It covers preparing quotes and invoices, communication methods and retail skills.

### **Learning outcomes**

In this unit, learners will be able to:

1. Understand business practices
2. Understand the sales skills used in horticultural businesses

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Understand business practices

### Topics

1:1 Quotes, invoices and record keeping for a business

1:2 Communication with customers and stakeholders

#### Topic 1:1

Preparing quotes and invoices for customers on horticultural work:

- Details of work to be carried out
- Breakdown of costs (materials, labour, machinery hire)
- Time frame/ estimate of length of work
- Time frame quote is valid for
- Reference number
- Contact details
- Dates and details of work carried out
- Invoice number
- Payment details

Records to be completed for a horticultural business:

- Legally required documents
- Business specific information

#### Topic 1:2

Methods of communication:

- Oral (face to face, telephone)
- Written (emails, texts, social media)

Importance of use of the appropriate method of communication and body language with customers and stakeholders.

## Learning outcome:

2. Understand the sales skills used in horticultural businesses

## Topics

- 2:1 Customer care skills in retail
- 2:2 Pricing, merchandising and profit margins
- 2:3 Legislative requirements

### Topic 2:1

The importance of customer service in a retail environment

Dealing with and assisting customers in different situations in a horticultural retail environments.

### Topic 2:2

Definitions of key terms and their contribution to business profitability:

- Costs
- Mark up
- Selling price
- VAT
- Gross profit
- Net profit
- Overheads
- Wastage

Calculate selling prices of products using:

- Costing up
- Costing down

The importance of profit margins and to work out profit margins on products/ merchandise.

The use and importance of displays in a horticultural retail environment.

### Topic 2:3

Legislative requirements within a retail environment:

- Trading standards
- HMRC
- Environmental health

## Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of examples of horticulture business types. It is expected to incorporate a mixture of lectures, visits to local employers such as garden centres, landscapers, local authorities, golf courses and production companies. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners

must be given the opportunity to deal a range of industry situations which reflects current industry practice. This unit could be delivered alongside unit 202 Working in the horticulture industry.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

<i>The Retail Florist Business (5<sup>TH</sup> Ed).</i> Illinois: Interstate Printers and Publishers. 1994. ISBN: 0813429670	Pfahl, PB., Behe B.K.
<i>Skills in the Land-based sector.</i> 1999.	Business Strategies Limited
<i>Increase Profit from Your Florist Shop: 145 easy ways to make more money from your flower shop</i> Publisher: CreateSpace Independent Publishing Platform (31 Mar. 2015) ISBN-10: 1508518742 ISBN-13: 978-1508518747	Small Business Success

### Websites

Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Department for Environment, Food and Rural Affairs	<a href="http://www.defra.gov.uk">www.defra.gov.uk</a>
Welsh Assembly Government	<a href="http://www.wales.gov.uk">www.wales.gov.uk</a>
Scottish Executive Environment and Rural Affairs Department	<a href="http://www.scotland.gov.uk">www.scotland.gov.uk</a>
Department of Agriculture and Rural Affairs (Northern Ireland)	<a href="http://www.daera-ni.gov.uk">www.daera-ni.gov.uk</a>
Business Education Websites	<a href="http://www.bized.ac.uk">www.bized.ac.uk</a>
Department for Trade and Industry	<a href="http://www.dti.gov.uk">www.dti.gov.uk</a>
Environment Agency	<a href="http://www.environment-agency.gov.uk">www.environment-agency.gov.uk</a>
Royal Horticultural Society	<a href="http://www.rhs.org.uk">www.rhs.org.uk</a>
Institute of Groundsmanship	<a href="http://www.iog.org.uk">www.iog.org.uk</a>
National Farmers Union	<a href="http://www.nfuonline.com">www.nfuonline.com</a>
The National Trust	<a href="http://www.nationaltrust.org.uk">www.nationaltrust.org.uk</a>
Natural England	<a href="http://www.naturalengland.org.uk">www.naturalengland.org.uk</a>



<b>Level:</b>	2
<b>GLH:</b>	150

### **What is this unit about?**

The purpose of this unit is for learners who are interested in commercial gardening and landscaping to have the required skills and knowledge for tasks within this area of horticulture.

### **Learning outcomes**

In this unit, learners will be able to

1. Carry out seasonal maintenance tasks for gardens
2. Carry out hard landscaping tasks
3. Carry out propagation techniques
4. Design a small garden area

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Carry out seasonal maintenance tasks for gardens

### Topics

1:1 Pruning

1:2 Beds and borders

#### Topic 1:1

Seasonal pruning using appropriate methods, techniques, tools and equipment for:

- Spring flowering
- Summer flowering
- Evergreen
- Shape and form
- Dead/ disease/ damage
- Herbaceous cutting back
- Dead-heading

#### Topic 1:2

Activities and tasks for maintaining beds and borders, using appropriate methods, techniques, tools and equipment:

- Weeding
- Feeding
- Mulching
- Irrigation
- Staking
- Training

Identification and control of common weeds, pests and diseases:

- Perennial and annual weeds
- Common pests: slugs, snails, aphids, weevils
- Diseases: black spot, rust, powdery mildew

## Learning outcome:

2. Carry out hard landscaping tasks

## Topics

- 2:1 Construct and maintain a fence  
2:2 Construct a hard surface

### Topic 2:1

Range: Post and panel, post and rail

Resources for a fence:

- Timber
- Posts (end, intermediate, straining)
- Post caps
- Nails, screws, staples and other fixings
- Concrete
- Hand tools and/or equipment

Construct a fence, using appropriate methods, techniques, tools and equipment:

- Establish a line
- Estimate quantities and costs of materials
- Mark out positions of post holes with correct centers
- Excavate
- Set depth, shape and line
- Ensure appropriate levels and line(s) are maintained
- Removal and correct disposal of debris

Maintain a fence, using appropriate methods, techniques, tools and equipment:

Fence repairs:

- Excavate and replace rotten/broken/damaged post(s)
- Readjust fence line as appropriate
- Replace broken rail(s)
- Repair of environmental damage
- Correct disposal of debris

Preventative treatments:

- Initial use of pressure treated timber
- Routine use of water-based or solvent-based timber treatments with correct disposal of any excess

### Topic 2:2

Range: Paving, blocks

Mark out a pattern from a plan

Methods:

- 3, 4, 5, triangle technique to construct right angles
- Tape measures
- Ranging poles, pegs and garden line or string
- Chalked string

- Marking compounds and spray paints

Lay rigid and flexible paving materials:

- Natural stone
- reconstituted stone
- concrete
- paving blocks and sets
- natural stone slabs
- pre-cast concrete paving
- gravel (bound and unbound)
- decking
- stretcher
- laid on dry sand bed or dry mortar mix or on mortar spots, as appropriate

### Learning outcome:

3. Carry out propagation techniques

### Topics

3:1 Collecting propagation materials

3:2 Propagate plants by seed sowing, cuttings and division

#### Topic 3:1

Collection of propagation material methods and techniques:

Types of propagation material:

- Division
- Cuttings (softwood, semi-ripe, hardwood, root)
- Seed sowing
- Natural vegetative means (bulbs, corms, stolons, stem tubers, plantlets, foliar embryos)

Collection of propagation material methods and techniques:

- Time of year
- Time of day
- Removal from stock plant
- Tools (secateurs, knives, spade, fork)
- Resources (bags, trays/boxes)

#### Topic 3:2

Division:

- Separation of plant into complete propagules
- Simple division by hand, fork and other tools

Cuttings:

- Stem cuttings - softwood, semi-ripe, hardwood
- Leaf cuttings
- Root cuttings

Methods:

- Reasons for broadcast and drilled sowing into prepared seedbeds outdoors (V shaped and flat bottomed drills)
- Broadcast and space sown into containers
- Level and depth
- Consolidation
- Seed covering materials (soil, compost, vermiculite) selection and characteristics of suitable growing media
- Watering (prior to and after sowing, from above or below)
- Labelling

### Learning outcome:

4. Design a small garden area

### Topics

- 4:1 Design a garden area  
 4:2 Planting plan for a small garden

#### Topic 4:1

The requirements of a garden design:

- Purpose
- Principles; symmetry, asymmetry, unity, scale, proportion, texture, form, balance, rhythm, line, focalisation, transition
- Information needs to be included in the garden design: basic title block, north point, key
- Timeline of garden design

Preparation of a garden design:

- Concept of ideas for a garden design
- Areas of planting, and hard landscape features within a plan

#### Topic 4:2

The principles of a planting design:

- Characteristics that will influence selection of plants - foliage, flower, colourful stems, scent, berries.
- Use of complementary and contrasting plants effectively in groups
- Positioning and grouping plants appropriately when planting
- Use of botanical names when identifying plants.

Production of a planting plan:

- Research plants to be included in a planting plan for a section of garden - details of height, spread, decorative merits, preferred growing conditions
- Draw/ write up planting plan for a section of garden in a recognised format

### Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of equipment, materials and sites suitable for gardening and landscaping. Learners will need to carry out a number of activities that are conducted in this part of the industry and have knowledge on the garden design principles. It is expected to incorporate a mixture of lectures, visits to local employers such as garden centres, landscapers, local authorities, public gardens and parks. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- |   |                            |
|---|----------------------------|
| <i>Brickwork.</i><br>Cheltenham: Nelson Thornes Ltd. 1991.<br>ISBN: 074-8-70310-1.  | Nash W.                    |
| <i>Garden Constructions.</i><br>London: Garden Book Club. 1975.   | Bateman R.                 |
| <i>How to build Paths, Steps and Footbridges.</i> North<br>Adams: Storey Books. 2004.   | Jeswald P.                 |
| <i>Introduction to Landscape Design and Construction.</i><br>Surrey: Gower Publishing. 1999.<br>ISBN: 056-6-07775-2.                        | Blake J.                   |
| <i>Landscape Construction: Earth and Water Retaining<br/>Structures.</i><br>Surrey: Ashgate Publishing Group. 2001.<br>ISBN: 056-6-09043-0. | Fortlage C and Phillips E. |
| <i>Principles of Horticulture.</i> 4 <sup>th</sup> ed.<br>Oxford: Butterworth-Heinemann. 2004. ISBN: 0-<br>7506-6088-0.                     | Adams C R and Early M P.   |
| <i>RHS Essential Garden Planning and Construction.</i>  | Brickell C.                |

London: Oxford Publishing Group 2006

*RHS Pruning and Training.* Surrey: Dorling  
Kindersley Publishers.2006.  
ISBN: 1405315265

Brickell C and Joyce D.

*The Complete Book of Garden Design, Construction  
and Planting.*  
London: Cassell Illustrated. 2002.  
ISBN: 1-841-88172-4.

Stevens D, Huntingdon L and Key R.

*The Complete Guide to Landscape Construction.*  
Minneapolis: Creative Publishing International.  
2006.  
ISBN-13: 978-1-58923-245-7.

Creative Publishing International.

*The Hillier Manual of Trees and Shrubs.* 3<sup>rd</sup> ed.  
Devon: David and Charles. 2007.  
ISBN: 07015326640

Hillier J and Coombes A J.

*The RHS Encyclopaedia of Gardening.* 2<sup>nd</sup> ed.  
Surrey: Dorling Kindersley Publishers. 2007. ISBN:  
1405322270

Brickell C.

*The Tree and Shrub Expert.*  
London: Transworld Publishers. 1999.  
ISBN: 0903505178

Hessayon D G.

*Woodwork for the Garden, step-by-step practical  
guides.*  
London: New Holland Publishers 2008.

Bridgwater A and Bridgwater G.

## Websites

Royal Horticultural Society  
Health and Safety Executive  
Ibstock Brick Ltd  
Marshalls

[www.rhs.org.uk](http://www.rhs.org.uk)  
[www.hse.gov.uk](http://www.hse.gov.uk)  
[www.ibstcok.com](http://www.ibstcok.com)  
[www.marshalls.co.uk](http://www.marshalls.co.uk)

<b>Level:</b>	2
<b>GLH:</b>	150

### **What is this unit about?**

The purpose of this unit is for learners who are interested in sports turf green keeping and grounds maintenance to have the required skills and knowledge for tasks within this area of horticulture.

This unit covers all sports surfaces, including artificial and blended surfaces.

### **Learning outcomes**

In this unit, learners will be able to

1. Maintain sports turf surfaces
2. Tractor driving with an attachment and trailer on a range of sports surfaces



## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Maintain sports turf surfaces

### Topics

- 1:1 Equipment to maintain sports surfaces
- 1:2 Renovate sports surfaces to Performance Quality Standards
- 1.3 Performance Quality Standards of sports surfaces
- 1:4 Monitor and assess the level of quality surfaces

Range: minimum of one fine turf (golf) and one winter games surface (artificial, natural blended surfaces, football pitch, rugby pitch)

#### Topic 1:1

Maintenance equipment:

- Pedestrian, ride-on and tractor mounted mower
- Mode of action - powered hand held; non-powered
- Irrigation equipment
- Fertiliser application tools
- Personal protective equipment

Materials:

- Topdressing
- Seed
- Turf

#### Topic 1:2

Renovate worn areas:

- Localised areas of damage/ heavy wear, pitch marks, divots, damaged edges
- Localised areas of pest/disease damage, including mammals
- Preparation of area and renovation activities (mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, fertilising, irrigation, re-turfing, drag matting, verticutting)
- Timing of operations
- Golf bunkers: preparation of area and renovation activities (raking/topping up sand, edging/repair of turf edges, mowing) steep grass banks

#### Topic 1:3

The objectives of the range of activities used to prepare and maintain sports surfaces to meet the needs of the sport and the environment:

- Improve or sustain presentational quality
- Structure
- Stability
- Carrying capacity
- Specific playing qualities

Performance Quality Standards:

- Levels of Performance Quality Standards (basic, standard and high)
- Structural: Determines playing quality and impacts on presentational quality (total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, root zone medium, evenness, gradient, pests, diseases, soil pH, infiltration rate)
- Presentational: appearance, surface debris, and sward colour
- Playing: ball roll/green speed, traction, hardness

#### **Topic 1:4**

Monitor the level of quality of golf surfaces:

- Structural: determines playing quality and impacts on presentational quality (total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, root zone medium, evenness, gradient, pests, diseases, soil pH, infiltration rate)
- Presentational: appearance, surface debris, and sward colour
- Playing: ball roll/green speed, traction, hardness

#### **Learning outcome:**

2. Tractor driving with an attachment and trailer on a range of sports surfaces

#### **Topics**

- 2:1 Drive tractor to given objectives
- 2:2 Hitch attachments to a tractor
- 2:3 Operate a tractor, trailer and attachment
- 2:4 Storage of tractors, trailers and attachments

Range: frozen, wet and dry ground, frozen and soft ground, slopes and level ground

#### **Topic 2:1**

Driving a tractor safely and efficiently around to meet given objectives:

- Assess risks
- Operator/ bystander injuries
- Stock
- Obstructions
- Ground conditions
- Public access
- Fuel consumption
- Emissions
- Tyre wear
- Damage to equipment

#### **Topic 2:2**

Hitching selected attachments to a tractor:

- Assess risks
- Power unit isolation
- External hydraulic controls

- Stored energy release
- Correct use of jacks
- Parking stands
- Attachment adjustment
- Road transport/field work

### **Topic 2.3**

Operation of tractors and attachments safely to meet given objectives

- Correct starting
- Maintaining appropriate operating/ working speed
- Power take off engagement
- Hydraulic control
- Electrical control
- Mechanical remote control
- Wet, dry and icy conditions
- Slopes
- Field procedures
- Tramlining
- Markers
- Global positioning system

### **Topic 2.4**

Preparation of tractors and attachments for storage ensuring they are ready for future use:

- Cleaning
- Decontamination
- Disconnection of attachments
- Refuelling
- Storage of linkage connectors
- Check on condition
- Reporting procedures

## Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of equipment, materials and sites suitable for greenkeeping and sports grounds maintenance. Learners will need to carry out a number of activities to industry standards and have knowledge on the requirements of the sports. It is expected to incorporate a mixture of lectures, visits to local employers such as golf courses and sports grounds. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- |  |                           |
|--|---------------------------|
| <i>Cricket Grounds: The Evolution, Maintenance and Construction of Natural Turf Cricket Tables and Outfields.</i><br>Yorkshire: The Sports Turf Research Institute. 1991.<br>ISBN: 1-873-43100-7 | Evans RDC.                |
| <i>Farm Machinery, 12<sup>th</sup> edition.</i><br>Blackwell Science. 1992.<br>ISBN: 0-632-03159-X   | Culpin C                  |
| <i>Farm Machinery.</i><br>Old Bond Publishing. 2005.<br>ISBN: 1-903-36668-2  | Bell B.                   |
| <i>Horticultural Machinery, 3<sup>rd</sup> edition.</i> Longman<br>Higher Education. 1985.<br>ISBN: 0-582-40807-5  | Hawker M and Keelyside J. |
| <i>Managing Healthy Sports Fields.</i><br>Sussex: Wiley. 2004.<br>ISBN: 0-471-47269-7  | Sachs P.                  |

- Natural Turf for Sport and Amenity: Science and Practice.* Adams WA and Gibbs RJ.  
Oxon: CAB International. 1994  
SBN: 0-851-98720-6
- Sports Ground Management: A Complete Guide.* Brown S.  
London: The Crowood Press. 2009. ISBN: 1-847-97094-X
- Sports Turf and Amenity Grassland Management.* Brown S.  
London: The Crowood Press. 2005.  
ISBN: 1-861-26790-8
- Turfgrass Management.* 8<sup>th</sup> ed. Harlow: Pearson Education Turgeon AJ.  
ISBN: : 0-131-14000-0

## **Journals**

Farmers Weekly  
Profi  
Amenity Machinery and Equipment

## **Websites**

Tractor Action	<a href="http://www.hse.gov/pubns/indg185.pdf">www.hse.gov/pubns/indg185.pdf</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Road Transport	<a href="http://www.roadtransport.com">www.roadtransport.com</a>
Public Services Website	<a href="http://www.direct.gov.uk/highwaycode">www.direct.gov.uk/highwaycode</a>
The Institute of Groundsmanship	<a href="http://www.iog.org">www.iog.org</a>

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<b>Level:</b>	2
<b>GLH:</b>	150

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### **What is this unit about?**

The purpose of this unit is for learners who are interested in hard landscaping within the horticulture industry to have the required skills and knowledge for tasks within this area of horticulture.

### **Learning outcomes**

In this unit, learners will be able to

1. Construct and maintain garden fences
2. Construct water features
3. Construct garden walls
4. Construct a hard surface
5. Undertake site survey, preparation and selecting tools
6. Contribute to the construction and maintenance of living landscape features

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Construct and maintain garden fences

### Topics

- 1:1 Construct and maintain a garden fence
- 1.2 Timber treatments
- 1.3 Legislation, construction and use of garden fences

Range: Post and panel, post and rail

#### Topic 1:1

Resources for a fence:

- Timber
- Posts
- Post caps
- Nails, screws, staples and other fixings
- Concrete
- Hand tools and equipment

Estimate quantities and costs of all resources needed for the construction of garden fences.

Construct a fence, using appropriate methods, techniques, tools and equipment:

- Establish a line
- Calculate quantities and costs of materials
- Mark out positions of post holes with correct centers
- Excavate
- Set depth, shape and line
- Ensure appropriate levels and line(s) are maintained
- Removal and correct disposal of debris

Maintain a fence, using appropriate methods, techniques, tools and equipment:

Fence repairs:

- Excavate and replace rotten/broken/damaged post(s)
- Readjust fence line as appropriate
- Replace broken rail(s)
- Repair of environmental damage
- Correct disposal of debris

#### Topic 1:2

Preventative treatments:

- Use of pressure treated timber
- Routine use of water-based or solvent-based timber treatments with correct disposal of any excess

#### Topic 1:3

Current landscape practices and legislation associated with the construction of garden fences:

- Damage to tree roots, plants and wildlife and all aspects that relate to healthy and safe working practices
- British Standards (BS 1722)
- Local Authority Planning Permissions for fences over 2m height
- Health & Safety at Work etc Act 1974
- Timber Research and Development Association (TRADA)

### Learning outcome:

2. Construct water features

### Topics

- 2:1 Materials used in the construction of water features
- 2:2 Dimensions, shapes and construction of the types of water features
- 2:3 Construct a water feature

#### Topic 2:1

Materials used in water features:

- Liners: clay (bentonite), concrete, polythene, butyl, pre-formed fibre-glass and related products
- Placement of lining material
- Edging materials: rock, paving, soil, turf;
- Environmental impact of rock and other materials; plant materials

#### Topic 2:2

Dimensions, shapes and construction of different types of water features:

- Ponds: depths, surface area, edge accessibility and egress, formal and informal, hidden edges, merged edges, raised edges, siting of ponds and water features
- Cascades: pre-formed (polyurethane), constructed on site, lined with butyl, constructed of rock and concrete/mortar
- Pebble features: millstones (real, artificial) and other drilled rock features, bubble fountains

#### Topic 2:3

Excavate the sites for water features safely:

- Domestic gardens
- Areas with public access
- Sites with good and impeded drainage
- Level and uneven ground
- Compliance with health and safety requirements/legislation
- Wearing of appropriate Personal Protective Equipment (PPE)
- Hand tools/equipment and machinery
- Safe installation of electrics (for fountains or features)

Ensure perimeter is level across the site and consistent with construction requirements.

Install small water feature safely

Install water feature edging safely:

- Rock
- Paving



- Planted soil
- Turf

### Learning outcome:

3. Construct garden walls

### Topics

- 3:1 Calculate dimensions required for foundation and garden wall
- 3:2 Calculate quantities of resources needed for the construction of garden walls
- 3:3 Construct brick walls safely
- 3:4 Current landscape practice and legislation

#### Topic 3:1

Determine the required dimensions of the foundation for a garden wall:

- Retaining and free standing
- Materials to be used
- Height and thickness of wall to be constructed
- Level or sloping site

#### Topic 3:2

Resources for garden walls:

- Bricks
- Blocks
- Pre-cast
- Natural stone
- Wallingambions
- Mortar (sand, cement, lime, water)
- Aggregates
- Brick ties
- Weep holes
- Damp-proof membrane

Estimate the quantities and costs of all resources.

#### Topic 3:3

Construct and render brick walls safely:

- Mix mortar by hand and by machine
- Cut bricks/blocks by hand
- Lay bricks/blocks as per bond requirement
- Strike or point the wall
- Render wall as appropriate
- Meet health and safety requirements e.g. adopt appropriate working practices, adhere to Control of Substances Hazardous to Health Regulations (2002) (COSHH)
- Select and wear appropriate Personal Protective Equipment (PPE)
- Adhere to Manual Handling Operations Regulations 1992

#### Topic 3:4

Current landscape practices and legislation:

- Building and planning regulations

- Legislation and Codes of Practice relating to health and safety:
  - Control of Substances Hazardous to Health (2002)
  - Health and Safety at Work etc Act 1974
  - PPE at Work Regulations 1992
  - Manual Handling Operations Regulations 1992)
- Risk assessments
- Relevant British Standards and Codes of Practice
- Concrete Association UK

### Learning outcome:

4. Construct a hard surface

### Topics

- 4:1 Using a plan to mark out pattern
- 4:2 Methods for constructing hard surfaces including basic foundations
- 4:3 Calculate quantities and costs of resources for paving
- 4:4 Lay rigid and flexible paving materials

#### Topic 4:1

Mark out a pattern from a plan:

- Geometric shapes: squares, rectangles, circles, triangles, ellipses, formal linear features
- Irregular shapes: 'Kidney' shaped areas, curvilinear shapes

Methods:

- 3, 4, 5, triangle technique to construct right angles
- Tape measures
- Ranging poles, pegs and garden line or string
- Chalked string
- Marking compounds and spray paints

#### Topic 4:2

Set out and establish areas to a level and a fall:

- Flat/level areas
- Flat areas on uneven sites
- Even falls on rectangular sites
- Equipment for setting levels and gradients (laser level, spirit level and pegs, Cowley level, quick set, boning rods)

Excavate and install foundations for subsequent works:

- Strip foundations for walls and edgings
- Raft foundations for patios and paved areas
- Use of aggregates and other suitable materials, tools, equipment and machinery

#### Topic 4:3

Calculate the quantities and costs of all resources, including tools and equipment.

#### Topic 4:4

Lay rigid and flexible paving materials:

- Natural stone
- Reconstituted stone
- Concrete
- Paving blocks and sets
- Natural stone slabs
- Pre-cast concrete paving
- Gravel (bound and unbound)
- Decking
- Paving laid in random
- Stretcher
- Laid on dry sand bed or dry mortar mix or on mortar spots

### Learning outcome:

5. Undertake site survey, preparation and selecting tools

### Topics

- 5:1 Linear survey
- 5:2 Site appraisal
- 5:3 Specialist tools for hard landscaping

#### Topic 5:1

Site details, using triangulation, running lines and offsets:

- Site inventory and metric measurements used to carry out simple site surveys using triangulation, running lines and offsets, in order to record site dimensions and shapes and the position of existing trees, plantings, services, access/exit points, features and structures
- An appropriate base line should be selected as the starting point
- Resources include: tape measures, chain lines, ranging poles/rods, recording materials
- Methods to comply with standard industry methods; may record data in a field book, note orientation of site

Simple scaled linear site surveys:

- Accurate simple linear site surveys to scale inclusive (where relevant) of soft and hard landscape features, services, structures, access and exit points, use standard notation/symbols for features and structures, handwritten or printed text to label the plan
- Measurement and illustration of levels is not included in this unit

#### Topic 5:2

Collection and recording of the physical aspects of a site, dimensions, access, aspect and topography:

- Site inventory record
- Access/exit points
- Areas of light and shade
- Aspect
- Changes in level
- Significant or unsightly view inside or outside the garden/site
- Ascertain north point
- Any hazards

- Where possible, any services

Location of underground services:

- Visual indicators
- Existing site plans
- Local knowledge
- Cable and pipe avoidance tools/equipment (CAT Scan)

### **Topic 5:3**

Tools and equipment used for hard landscaping:

- Wacker plates
- Angle grinder
- Mortar board
- Laser level/ spirit level/ quick set
- Mallets
- Mixer

Reasons for maintenance of tools and equipment.

Care and maintenance tasks for tools and equipment:

- Cleaning
- Storage
- Sharpening
- Manufacturer's instructions

## Learning outcome:

6. Contribute to the construction and maintenance of living landscape features

## Topics

- 6:1 Planning materials, resources and plants
- 6:2 Design of a feature
- 6:3 Contribute to the construction of a living landscape feature
- 6:4 Maintain living landscape features

Range: Green walls, green roof

### Topic 6:1

Materials:

- Trellis
- Wire
- Frame
- Membrane
- Grow bags
- Growing media

Resources:

- Irrigation system
- Fertilizers
- Tools and equipment

Plants:

- Climbers
- Mosses
- Wall shrubs
- Grasses
- Herbs
- Fruits and vegetables
- Bedding plants
- Annuals

### Topic 6:2

The requirements of living landscape feature:

- Purpose
- Principles
- Information to be included on design: basic title block, key

Preparation of design for living landscape feature:

- Concept of ideas
- Plant list using full botanical names
- Irrigation requirements

### **Topic 6:3**

Contributing to the construction of a living landscape feature:

- Preparation of area
- Selection of plants
- Construction of wall or roof
- Planting
- Installation of irrigation system (as required)
- Immediate aftercare

### **Topic 6:4**

Maintenance activities:

- Irrigation
- Feeding
- Planting
- Repair work

## **Guidance for delivery**

During the delivery of this unit, learners should have access to a wide range of equipment, materials and sites suitable for landscaping. Learners will need to carry out a number of activities that are conducted in this part of the industry. It is expected to incorporate a mixture of lectures, visits to local employers such as landscapers, local authorities, public gardens and parks. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice.

## **Employer engagement**

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- Brickwork.* Nash W.  
Cheltenham: Nelson Thornes Ltd. 1991.  
ISBN: 074-8-70310-1.
- Garden Constructions.* Bateman R.  
London: Garden Book Club. 1975.
- How to build Paths, Steps and Footbridges.* North Adams: Storey Books. 2004. Jeswald P.
- Introduction to Landscape Design and Construction.* Blake J.  
Surrey: Gower Publishing. 1999.  
ISBN: 056-6-07775-2.
- Landscape Construction: Earth and Water Retaining Structures.* Fortlage C and Phillips E.  
Surrey: Ashgate Publishing Group. 2001.  
ISBN: 056-6-09043-0.
- Principles of Horticulture.* 4<sup>th</sup> ed. Adams C R and Early M P.  
Oxford: Butterworth-Heinemann. 2004. ISBN: 0-7506-6088-0.
- RHS Essential Garden Planning and Construction.* Brickell C.  
London: Oxford Publishing Group 2006
- RHS Pruning and Training.* Surrey: Dorling Kindersley Publishers.2006. Brickell C and Joyce D.  
ISBN: 1405315265
- The Complete Book of Garden Design, Construction and Planting.* Stevens D, Huntingdon L and Key R.  
London: Cassell Illustrated. 2002.  
ISBN: 1-841-88172-4.
- The Complete Guide to Landscape Construction.* Creative Publishing International.  
Minneapolis: Creative Publishing International. 2006.  
ISBN-13: 978-1-58923-245-7.
- The Hillier Manual of Trees and Shrubs.* 3<sup>rd</sup> ed. Hillier J and Coombes A J.  
Devon: David and Charles. 2007.  
ISBN: 07015326640
- The RHS Encyclopaedia of Gardening.* 2<sup>nd</sup> ed. Brickell C.

Surrey: Dorling Kindersley Publishers. 2007. ISBN:  
1405322270

*The Tree and Shrub Expert.* Hessayon D G.  
London: Transworld Publishers. 1999.  
ISBN: 0903505178

*Woodwork for the Garden, step-by-step practical guides.* Bridgwater A and Bridgwater G.  
London: New Holland Publishers 2008.

*The Illustrated Practical Guide to Water and Rock Gardening: everything you need to know.* Robinson P.  
London: Southwater Publisher. 2008

*The Rock and Water Garden Expert.* London: Hessayon D G.  
Transworld Publishers 1993.

*A Practical Guide to Creating a Garden Pond, and year-round maintenance.* Pondmasters. Surrey: Quick G.  
Interpet Internet Publishing. 2000

*The Pond Specialist.* Bridgwater A & G.  
London: New Holland Publishers. 2008

## Websites

Royal Horticultural Society	<a href="http://www.rhs.org.uk">www.rhs.org.uk</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Ibstock Brick Ltd	<a href="http://www.ibstcok.com">www.ibstcok.com</a>
Marshalls	<a href="http://www.marshalls.co.uk">www.marshalls.co.uk</a>



<b>Level:</b>	2
<b>GLH:</b>	150

### **What is this unit about?**

The purpose of this unit is for learners who are interested in production of plants and crops to have the required skills and knowledge for tasks within this area of horticulture.

### **Learning outcomes**

In this unit, learners will be able to:

1. Carry out crop production techniques
2. Carry out protected crop protection
3. Carry out propagation techniques indoors and outdoors
4. Understand pests, weeds, diseases and disorders
5. Know current technologies in production horticulture

## Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

### Learning outcome:

1. Carry out crop production techniques

### Topics

- 1:1 Prepare ground and growing medium for sowing, planting and potting of crops to commercial efficiencies
- 1:2 Planting, sowing and potting crops in growing medium and ground
- 1.3 Maintain crops
- 1:4 Harvesting crops and selection of products for sale
- 1:5 Crop scheduling

Range: Ornamentals and edibles

#### Topic 1:1

Preparation of ground and growing medium by hand methods to receive crops:

- Control/remove weeds and general debris
- Single/double digging (use of a rotary cultivator may be beneficial but it is not essential)
- Forking
- Treading
- Raking and levelling
- Production of required tilth
- Addition of organic matter
- Application of fertiliser as required
- Lime as required by specific crops

#### Topic 1:2

Sowing and planting young plants:

- Sowing in flat bottomed, deep and shallow drills
- Planting young plants/transplants to a line
- Row and plant spacing
- Depth of sowing and planting
- Immediate aftercare- watering
- Labelling

#### Topic 1:3

Crop maintenance tasks:

- Thinning
- Watering
- Weed control
- Pest and disease monitoring
- Health and safety and environmental issues; tools required for hand cultivation
- Cultivation methods appropriate to different soil types

#### Topic 1:4

Harvesting:

- Harvesting and storage requirements of a range of root crops, leafy crops, legumes, bulbs and salad crops
- Row and plant spacing
- Depth of sowing and planting
- Factors that affect yield, size and success rate

Selection of crops for sale:

- Order picking
- Handling
- Storage
- Transport

### **Topic 1:5**

Crop seasonality:

- Crop rotation
- Seasonality
- Timing of sowing and planting
- Successional sowing
- Station sowing
- Intercropping

### **Learning outcome:**

2. Carry out protected crop protection

### **Topics**

- 2:1 Protected growing environments  
2:2 Growing crops in protected environments

### **Topic 2:1**

Advantages and disadvantages of glasshouses and polythene tunnels in which to produce plants:

Green/glasshouses:

- Advantages:
  - Warm
  - Good heat retention
  - Good light transmission
  - Easy to ventilate
  - Good growing environment
  - Strong
  - Low maintenance
- Disadvantages:
  - Expensive to erect
  - If glass used it is fragile
  - Requires planning permission

Polythene tunnels:

- Advantages:
  - Cheap to erect
  - Creates humid growing environment
  - Shelters plants from wind
  - Easy to repair minor damage
- Disadvantages:
  - More difficult to ventilate effectively
  - Can create temperature extremes
  - Require frequent re-cladding
  - Can create high levels of condensation

#### Glasshouse types:

- Wide-span
- Single span
- Double span
- Multi-span
- Venlo types

#### Polythene tunnel types:

- Single bay/span
- Multi-bay/span
- Seasonal covers (Spanish tunnels)
- Combined polythene/net tunnels

#### Construction and cladding materials:

- Green/glasshouses:
  - Concrete
  - Steel
  - Alloys
  - Aluminium
  - Glass (double and triple glazing)
  - Wood (Alpine Houses)
- Polythene tunnels:
  - Concrete
  - Steel
  - Alloys
  - Wood
  - Polythene (treated films and plastics)
  - Netting
- Construction of glasshouses:
  - Shapes (hemisphere, dome, mansard)
  - Pitched roof glasshouses (clear span, single span, double span, multi-span)
  - Advantages and disadvantages of different shapes, light transmission qualities, size of glass panes
- Construction of polythene tunnels:
  - Single span
  - Double span
  - Multi-span
  - Tightness of polythene over frame (should be put on in warm weather)
  - Use and depth of ground tubes
  - Construction/installation of doors (sliding or fixed)

Factors affecting the growing environment:

- Air temperature (night and day)
- Root zone warming
- Light levels
- Day length
- Relative humidity
- Ventilation and air movement
- Carbon dioxide levels
- Monitoring:
  - By observation
  - Use of thermometers
  - Hygrometers
  - Aspirated screens (housing sensitive monitoring equipment)
  - Automatic computer monitoring

## Topic 2:2

Preparation of sites, containers, growing media and plants in readiness for planting sites:

- Potting bench, potting machine, bearing in mind ergonomics.
- Containers: pots (plastic/clay), modules, standard trays, half trays
- Growing media: for young plant material, for established plants: loam-less composts, loam-based composts
- Plants: seedlings, rooted cuttings, cell/plug plants, established plant material

Potting young plant material so as to optimise success and minimise waste:

- Potting off and potting on/up
- Appropriate growing media selected (compost) – use of loam-less and/or loam-based potting composts
- Size and type of container
- Handle young plants with care to minimise root and top growth damage
- Pot at correct depth and in centre of container selected
- Lightly firm in
- Label
- Water
- Stop plants if required at potting stage

Set out and provide aftercare to plants following potting:

- Take off and stand down/set out plants following potting (space out plants according to size of container/plant)
- Aftercare:
  - Irrigation
  - Support
  - Protection from and control of pests, disease and weeds
  - Provision of appropriate temperatures (aerial and basal)
  - Pinching/stopping
  - Ensure adequate lighting (may need supplementary lighting)

## Learning outcome

3. Carry out propagation techniques indoors and outdoors

## Topics

- 3:1 Collecting propagation materials
- 3:2 Propagate plants by seed sowing and vegetative methods
- 3:3 Aftercare of plants in a propagation environment

### Topic 3:1

Collecting propagation material:

- Types:
  - Division
  - Cuttings (softwood, semi-ripe, hardwood, root)
  - Budding/grafting
  - Natural vegetative means (bulbs, corms, stolons, stem tubers, plantlets, foliar embryos)
- Methods:
  - Time of year
  - Time of day
  - Removal from stock plant
  - Tools (secateurs, snips, knives, spade, fork, dividing knife)
  - Resources (polythene bags, trays/boxes)
  - Select material which is true to type
  - Appropriate size, not too vigorous and pest and disease free

### Topic 3:2

The use of division and cuttings as methods to propagate plants:

- Division:
  - Separation of plant into complete plantlets
  - Simple division by hand
  - Splitting with forks
  - Cutting with knife or other tools
  - Used for many herbaceous perennials and grasses (may also be appropriate for bulbs, corms, tubers)
- Cuttings:
  - Removal of one section of the plant
  - Stem cuttings - softwood, semi-ripe, hardwood, leafy and deciduous, nodal and intermodal, used on many tender plants, shrubs, herbaceous perennials,
  - Leaf petiole cuttings
  - Leaf cuttings – whole leaf, leaf section
  - Foliar embryos
  - Leaf bud cuttings/single node stem cuttings
  - Root cuttings (thick and thin)
  - Method used for some alpiners, herbaceous and climbing plants, trees and shrubs

Preparation of containers and outdoor seed beds for seed sowing:

- Containers:
  - Seed trays
  - Pots
  - Cells or modules (infill's)
  - Appropriately filled with suitable growing media
  - Growing media prepared for depth, structure, consolidation, level surface, moisture

- Outdoor seed beds:
  - Removal of weeds, pests and diseases as applicable
  - Addition of organic matter to improve structure and/or drainage material is required
  - Base fertiliser application as appropriate
  - Depth of preparation
  - Use of hand tools and pedestrian-operated machinery
  - Tilt
  - Consolidation
  - Levelling
  - Moisture content

Sowing seeds by broadcasting in containers and in drills outside:

- Broadcasting into containers:
  - Fine seed with added carrier (fine dry sand)
  - Seed that can be broadcast easily by hand without carriers, hygiene and safety maintained throughout, waste minimised
- Drills outside:
  - Preparation of V-shaped and flat bottomed drills by hand
  - Depth and moisture content
  - Seed scattered into drills or space-sown along the drill by hand, hygiene and safety maintained throughout, waste minimised
  - Drills watered prior to sowing if conditions dry

### Topic 3:3

Aftercare of plants:

- Aftercare:
  - Indoor sowings covered with growing media (compost or vermiculite) effectively where required or left uncovered for fine seed
  - Light excluded or allowed as required by species
  - Watering
  - Labelling
  - Placement into suitable germination environment
  - Monitoring until germination
  - Acclimatisation to growing conditions (weaning)
  - Pricking out or separation
- Aftercare:
  - Outdoor sowings covered in suitable depth of growing media
  - Watering
  - Labelling
  - Protection from adverse conditions, pests and diseases
  - Weed control
  - Thinning and transplanting

### Learning outcome:

4. Understand pests, weeds, diseases and disorders

### Topics

- 4:1 Common pests, weeds, diseases and disorders
- 4:2 Prevention and control of pests, weeds, diseases and disorders

### **Topic 4:1**

Definition of the terms:

- Pest
- Weeds
- Disease
- Disorder

Common pests:

- Insects (aphids)
- Molluscs (snails, slugs)
- Mammals (mice)
- Birds

Common diseases:

- Fungal
- Viral
- Bacterial

Common disorders:

- Nutritional
- Environmental

### **Topic 4:2**

Methods of prevention and control:

- Chemical
- Biological
- Cultural
- Mechanical
- Timing
- Legislation
- Hygiene of the growing environment
- Bio-security

### **Learning outcome:**

5. Know current technologies in production horticulture

### **Topics**

5:1 Technologies used in production horticulture

### **Topic 5:1**

The advantages and disadvantages of technologies used in horticulture:

- Hydroponics
- Micro crops
- Seed technology
- Environmental technology
- Micro-propagation
- Fertigation
- Robotics



- Lighting
- Testing and analysis

## Guidance for delivery

During the delivery of this unit, learners should have access to a wide range of equipment, materials and sites suitable for production horticulture. Learners will need to carry out a number of activities that are conducted in this part of the industry and to industry standards. It is expected to incorporate a mixture of lectures, visits to local employers such as garden centres and producers. At level 2 it is expected that considerable emphasis will be placed on practical activity wherever possible.

It is accepted that lectures will be necessary at Level 2 but for this unit for this unit it is recommended that they are linked directly with interactive lessons in a real environment. Learners must be given the opportunity to deal a range of industry situations which reflects current industry practice.

## Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

## Suggested learning resources

### Books

- |  |                        |
|--|------------------------|
| <i>Encyclopaedia of Organic Gardening.</i> (Henry Doubleday Research Association). Essex: Dorling Kindersley Publishers. 2005. | HDRA.                  |
| <i>Organic Gardener's handbook.</i> Wiltshire: The Crowood Press Ltd. 2007. ISBN: 978-1-86126-936-2.                           | Littlewood M.          |
| <i>Pests: How to control them on fruit and vegetables.</i> Kent: Search Press Ltd. 2006. ISBN: 1-84448-156-5.                  | Pears P and Sherman B. |
| <i>Pruning Fruiting Plants.</i> London: Southwater Publishers. 2006.   | Bird R.                |
| <i>RHS Organic Gardening.</i> 2 <sup>nd</sup> ed.  | Pears P.               |

- London: Mitchell Beazley Publishers. 1999.  
*RHS Pest & Diseases*. 2<sup>nd</sup> ed. Halstead A and Greenwood P  
 Essex: Dorling Kindersley Publishers. 2003.
- RHS Pruning and Training*. 2<sup>nd</sup> ed. Essex: Dorling  
 Kindersley Publishers. 2003. Brickell C.
- RHS The Fruit Garden Displayed*. 9<sup>th</sup> ed. London:  
 Cassell Illustrated. 1998 Baker. H.
- The Fruit Expert and The Vegetable Expert*. Del  
 Norte: Pbi Publications. 1990. Hessayon D G.
- The Vegetable Garden Displayed*. London: Batsford  
 Ltd. 1994. Larkcom. J.

### **Journals**

Horticulture Week incorporating The Grower Magazine

## Websites

Royal Horticultural Society

[www.rhs.org.uk](http://www.rhs.org.uk)

Soil Association

[www.soilassociation.org.uk](http://www.soilassociation.org.uk)

Garden Organic

[www.gardenorganic.org.uk](http://www.gardenorganic.org.uk)

## Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on [www.cityandguilds.com](http://www.cityandguilds.com).

### City & Guilds Centre Manual

This document provides guidance for organisations wishing to become City & Guilds approved centres, as well as information for approved centres delivering City & Guilds qualifications. It covers the centre and qualification approval process as well as providing guidance on delivery, assessment and quality assurance for approved centres.

It also details the City & Guilds requirements for ongoing centre and qualification approval, and provides examples of best practice for centres. Specifically, the document includes sections on:

- the centre and qualification approval process
- assessment, internal quality assurance and examination roles at the centre
- registration and certification of candidates
- non-compliance and malpractice
- complaints and appeals
- equal opportunities
- data protection
- management systems
- maintaining records
- internal quality assurance
- external quality assurance.

### Our Quality Assurance Requirements

This document explains the requirements for the delivery, assessment and awarding of our qualifications. All centres working with City & Guilds must adopt and implement these requirements across all of their qualification provision. Specifically, this document:

- specifies the quality assurance and control requirements that apply to all centres
- sets out the basis for securing high standards, for all our qualifications and/or assessments
- details the impact on centres of non-compliance

The **centre homepage** section of the City & Guilds website also contains useful information on

- **Walled Garden**: how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for e-assessments.

City & Guilds  
**Believe you can**



[www.cityandguilds.com](http://www.cityandguilds.com)

## Useful contacts

### UK learners

General qualification information

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**E: [learnersupport@cityandguilds.com](mailto:learnersupport@cityandguilds.com)**

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### International learners

General qualification information

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**E: [intcg@cityandguilds.com](mailto:intcg@cityandguilds.com)**

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### Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

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**E: [centresupport@cityandguilds.com](mailto:centresupport@cityandguilds.com)**

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### Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

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**E: [singlesubjects@cityandguilds.com](mailto:singlesubjects@cityandguilds.com)**

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### International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

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**E: [intops@cityandguilds.com](mailto:intops@cityandguilds.com)**

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### Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

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**E: [walledgarden@cityandguilds.com](mailto:walledgarden@cityandguilds.com)**

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### Employer

Employer solutions, Mapping, Accreditation, Development Skills, Consultancy

T: +44 (0)121 503 8993

**E: [business@cityandguilds.com](mailto:business@cityandguilds.com)**

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If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **[feedbackandcomplaints@cityandguilds.com](mailto:feedbackandcomplaints@cityandguilds.com)**

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## **About City & Guilds**

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

## **City & Guilds Group**

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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